PSYCHOANALYSIS AND GLAND PERSONALITIES

ANDRÉ TRIDON

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BOOKS BY ANDRÉ TRIDON

PSYCHOANALYSIS, ITS HISTORY, THEORY AND PRACTICE

PSYCHOANALYSIS AND BEHAVIOR

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PSYCHOANALYSIS AND GLAND PERSONALITIES

PSYCHOANALYSIS AND MAN'S UNCONSCIOUS MOTIVES (*In preparation*)

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BY

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PSYCHOANALYSIS AND GLAND PERSONALITIES

CHAPTER I

THE INTERNAL SECRETIONS AND THE GLANDS

Every age brings its own discoveries, its own inventions, its theories, philosophies, morals and ethics. Sometimes these products possess the permanency of truth, but more often they are only the fads of a moment, the fancies of an unbridled imagination. Medicine is not alien to these influences: through every age it has had its period of colorful hopes, created only to perish shortly afterwards in the light of fact and experience. In its evolution it has had, first, its periods of magic and incantation, where a mandrake root tied about one's waist or a spider shut up in a nut-shell and worn as an amulet was a cure-all, both for the melancholy of love and the throes of labor. From this period of superstii-

tion medicine advanced to those elementary curative measures as blood-letting and cupping. Blood-letting was already established at the time of Hippocrates who although a very keen observer, and supposedly a direct descendant of Æsculapius, the god of medicine, firmly believed that opening a vein let out the disease. This bloody procedure gradually gave way to dry-cupping and the application of leeches, methods still employed in hamlets and villages throughout the world.

The explosion of these theories in medicine came with the discovery of the microbe as the cause of disease, but new hordes of empiricists arose who heralded countless drugs, each of which was supposed to be a panacea in itself. As a reaction to this drug period, we have to-day an age of therapeutic nihilism, the characteristics of which are an inveterate iconoclasticism toward the methods of the previous schools and the advocating of mechanical methods such as chiropractics, osteopathy, electrotherapy and mechanotherapy. Another branch springing from the same stem is composed of auto-suggestionists and mind-healers, who leave drugs and mechanical methods alone and rely solely upon the omnipotence of the subconscious mind to per-

form cures. Although it is undeniable that much pain and physical wretchedness are mental, too great a task is often imposed upon the unprotesting "unconscious." Sometimes success is achieved, giving rise to hysterical acclamation on the part of an ignorant public and undue self-assurance on the part of the suggestionist in charge. With the dissemination of undigested scientific half-truths misunderstanding is bound to occur, resulting in the destruction of many a sound theory.

Out of this Pandora-box of chaos comes forth the hope of a new therapeutic measure, evidenced by the discovery of glandular activity. Exhaustive research work has been accomplished by various scientists, and many an interesting fact on the significance and function of glands heretofore ignored has been brought into the light from the limbo of the unknown. The glands and the internal secretions have now become subjects of burning issues in the medical world. It is the task of this generation to wrest from the jealously guarded secrets of nature the knowledge of such facts as will give man more dominion over himself and the forces within him and about him.

The Theory of Glandular Activity

The first definite work on the internal secretions was done in the eighteenth century by Theophile de Bordeu, a French physician. Attracted by the sexual side of men and women, he studied the characteristics of eunuchs, capons and spayed female animals. These observations led him to believe that there were certain gland secretions into the blood which determined the sexual qualities of the individual. The studies of Bordeu were corroborated by the experiments of A. A. Berthold, of Goettingen, who found that when he separated the duct of the male sexual gland or testicle of a rooster from the body of the gland itself there were no changes in the male characteristics. The voice, the fighting instinct, the desire to reproduce and the comb and wattles remained the same. However, when he removed the gland entirely, the male traits disappeared. Berthold concluded that there was an internal secretion in addition to the external secretion and that this internal secretion determined the secondary sexual characteristics. This Goettingen investigator was the first to prove the existence of a gland with a true internal secretion.

In the middle part of the nineteenth century Claude Bernard, professor of physiology in the Collège de France, coined the term "internal secretion" and showed that the blood was the transporting medium for these secretions.

Thomas Addison was the first Englishman to do any effective work upon the glands. He described a fatal disease characterized by weakness and bronzing of the skin, and found that this disease was due to tuberculosis of the adrenal glands. This malady has since been known to science as Addison's disease. The work of Addison stimulated Brown-Sequard, the American Frenchman to experimentation. He removed the adrenal bodies in animals and found that after a period of from twenty-four to forty-eight hours they died of weakness. If only one adrenal gland was removed there was no change in the animal, but upon the removal of the other gland, death intervened. He thus proved that the adrenal glands gave forth an internal secretion essential to life.

The work of Brown-Sequard spurred many scientists to further research. Friedleben described the action of the thymus gland; Moritz Schiff of Germany, Curling of England, and Gull and Ord of

London revealed the importance of the thyroid gland; while Kocher and Reverdin were the first surgeons, who, when operating upon goiter found that the removal of the thyroid gland produced definite symptoms. Since then investigations have been carried on regularly throughout the civilized world, and our knowledge of the action of these glands has increased to such an extent that there has been established the science of Endocrinology, which deals exclusively with the anatomy, physiology, pathology and therapeusis of these glands.

The Glands and Their Work

We have been familiar with the function of the glands but it has not been until very recently that we have grasped their full significance in the body economy. Roughly speaking, glands are organs that might be termed the factories of the human organism, for they are instrumental in manufacturing the products that are of vital importance to the well-being of the body. The glands are many and variously located, as for instance in the lining of the wall of the stomach, the abiding place of the gastric glands, or in front of the ears or between the lower jaw and the floor of the mouth, the site of the sali-

vary glands. Though the glands are similar in function, that is, though they exist for the purpose of converting raw material from the blood into juices essential to the body, they differ in the means of transmitting the products they manufacture. They may be divided into three classes: the glands, like the salivary glands, possessing ducts or tubes which connect them with an outer surface such as the mouth; the ductless glands, or glands of internal secretion which pass their converted products directly into the blood-stream without the medium of a tube; and the glands typified by the ovary and testicle which reveal both an internal and external secretion. Of the three kinds of glands the last two have offered in the past few decades the most engrossing material for study. It is with them, chiefly, that the science of Endocrinology deals, for, as the name itself implies, it is the study of the *glands of internal secretion.*

As we have noted before, the glands of internal secretion produce the substances necessary to the correct functioning of the body and transmit these substances directly into the blood without the intervention of a connecting duct. The most frequently recurring in science, and one that is of the

utmost importance in determining the various characteristics of the individual, is the thyroid gland, situated in the neck and closely allied with the parathyroid bodies. The pituitary gland, lying at the base of the skull, is a tiny mass that has within it the power of creating giants or dwarfs, besides exerting great influence upon the brain functions and life itself. The pineal gland, located behind and above the pituitary, is an even smaller organ than the other two, and like the thymus, whose internal secretion has not yet been definitely discovered, seems to have a marked effect upon the development of the individual in the early stages of life. There are still two other glands belonging to the endocrine group, the adrenals, sometimes called supra-renals, which, as the name denotes, are located above the renal bodies or kidneys. They were discovered in the sixteenth century by the anatomist Eustachius, and though research has been carried on in minute detail, they still baffle science as to their true function. There is another group of glands which may be admitted into this category, for in all probability, they too produce an internal secretion, although it has not been positively ascertained. They are the thymus, which has already been mentioned, the

tonsils, the lymph glands, the lymph follicles, the spleen and the bone marrow.

Of the glands that produce both an internal and an external secretion, we shall treat later in detail, but suffice it to mention here, that the secretions, though closely related, serve different purposes. For instance, whereas the external secretion in the generative glands influences reproduction, the internal secretion is active in determining male and female characteristics. The generative, or sex glands, are known as the gonads, or interstitial glands, and are the testicles in the male and the ovaries in the female. Other glands belonging to this group having two secretions, are the pancreas, the small intestine and the stomach. All these glands are factors in the differentiation of personality.

Personality and the Glands

What is personality? Berman says of it, "Personality embraces much more than the psychic attributes. It is not the least important of the lessons of endocrine analysis that here is no soul and no body either." Endocrinology, in other words, is a weighty consideration in the modern definition of personality. Yet it is not, after all, such a new as-

sociation between physical factors and the make-up of the individual, for Burton, copying the ancients in his Anatomy of Melancholy categorized men into types according to their humors or secretions. To this day we still speak of individuals as choleric, sanguine, phlegmatic or bilious.

Among contemporary scientists personality is more accurately classified through the study of glandular functioning, and the old nomenclature has given place to the more modern and scientific terms based upon close gland study. Where Burton would have called a type phlegmatic, we say to-day that he has an insufficient stimulation of the thyroid gland; a sanguine, aggressive person has active adrenal glands and is therefore largely influenced by them in his behavior, while the slow, bilious, fear-haunted, weak-willed personality is the product of adrenal insufficiency.

It is not only temperamentally that an individual is affected by the proper or abnormal functioning of his glands. His physical peculiarities are to a very great extent not only the result of his being created in the image of God, but more so the sum total of glandular activity. These tiny bodies, some of them no larger than a pea, out of which may re-

sult either a Colossus or a Tom-Thumb, are the sculptors of humanity. A giant and a dwarf, in these terms, are nothing more or less than the capricious expressions of the pituitary gland. The fat and the lean, the freaks that are the chief attractions at the circuses and curiosity shows, are not the products of predestination, but the result of the disturbance of some internal secretion.

Psychoanalysis and Personality

Freud, Jung, Adler and their disciples attribute the personality of an individual solely to his psychic make-up, disregarding completely the part played by physical factors. No mention is made in any of their works of the rôle which the glands of internal secretion enact in building up personality. The endocrinologists go to the other extreme, and unmindful of the psychoanalysts believe that personality lies in the glands. Both views are only half-truths, and the solution lies in the thorough comprehension of the reciprocal influence exerted by the mind on the glands and by the glands on the mind. Overdevelopment of the sexual glands causes a predisposition to sexual overactivity and arouses eroticism, but sexual thoughts will also arouse sexual activity and

eroticism. Therefore it is evident that the personality as evidenced by such sexual manifestations may be influenced either by the glands or by the mind.

Disturbances of the internal secretions may give rise to certain phobias, obsessions and inferiority complexes. These mental derangements may be removed by psychoanalytic treatment. The cure may be either temporary or permanent. The failure of a complete removal of the symptom is due to the fact that the underlying cause, mainly, the disturbance of the internal secretion, has not been attacked. To bring about a complete cure, the psychoanalytic treatment should be followed by glandular therapy.

Dudley Ward Fay reports a series of twenty-two cases upon which a diagnosis of dementia præcox was made. All of these cases showed disturbances of the endocrine glands. Fourteen of them had a diminished thyroid activity, while in five of them the thyroid activity was increased. Two had a marked decrease of adrenal secretion, and one revealed a perverted pituitary function. Fourteen of these cases were improved by glandular therapy. Three showed no improvement. Most of the patients gave indications of a struggle with perverse

impulses of the creative instinct, that is a sexual conflict which the Freudians believed to be psychogenetic. The feeding of thyroid glands reduced the introversion and caused the patient to adjust himself to his surroundings.

Barham describes a case of insanity with decreased thyroid activity. After the thyroid derangement had been regulated by glandular therapy and the mental symptoms had subsided, the psychic disturbances broke out anew when the patient returned home. This demonstrates that gland therapy in itself may be insufficient and should be supplemented by psychoanalysis.

Psychoanalysis, Personality and the Glands

The correlation between the glands and personality has already been shown. The correlation between personality and psychoanalysis has also been demonstrated. It now remains to prove the interrelation between psychoanalysis, personality and the glands.

Jelliffe says: "Variations in the actual endocrine organs undoubtedly alter the reactivity of the individual so that certain complexes, always difficult in themselves, even under the best of circumstances, are

not as well dealt with by reason of this (for lack of a better term) what may be called 'sensitiveness.' We know that complexes are a necessary part of everyone's evolution. Why should fixation and regression occur with greater intensity in some people than in others? Does a defective hyper-thymus-gonadal group handle an incest complex more inadequately because of the early appearance of the craving, thus forcing a repression before its time, with its consequent readjustment to a narcissistic libido fixation? What does a thyroidal-adrenal group do with the same situation? If the psychical factors, and the knowledge of the accidents, traumata, etc., can be integrated with the constitutional factors, I feel sure we will be on our road to a real psychiatry.

"For the present all we can hope for is to indicate the lines along which the correlations can be made. The real indices of endocrine adjustments are far from being well-known. We have a few facts bearing on extremes, the means are in a jumble. Psychoanalysis also is in a similar situation. But it does deliver definite qualities, . . . as for quantity, that is, the force behind the wish,—that is still an important problem. Two patients may deliver us two similar incest dreams. On the face of them,

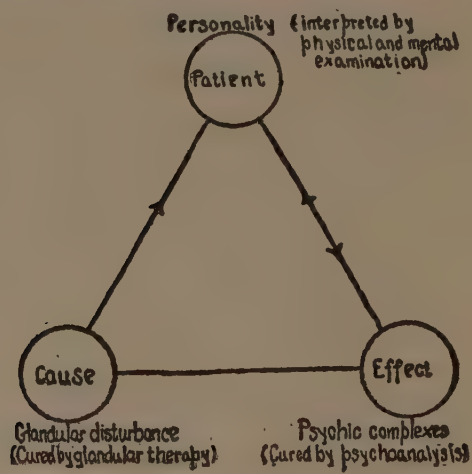
they have come through the censorship with quite similar distortions and displacement,—yet they may have behind them dynamic intensities of great variation. . . ."

Two subjects may present themselves with similar inferiority complexes. The analysis of both cases may reveal the same psychic conflict. One may be cured, while the other may fail to be relieved. A thorough physical examination will reveal different physical personalities. The latter may show signs of adrenal insufficiency, and we know from experimental evidence that fear is due to the disturbance of the adrenal secretion. In this case the inferiority complex springs from the fear, which, in its turn, has been caused by the disease of the adrenal glands. Psychoanalysis in such cases may temporarily remove the complex, but there will remain a marked tendency toward recurrence, due to the fact that the cause has not been treated. In such instances glandular therapy must be used in conjunction with psychoanalysis.

On the other hand glandular inferiority is sometimes used as an excuse for complexes that have no relation whatever with the internal secretions, but are purely psychogenetic. Even as the glands

may affect the mind, so reciprocally may the mind affect the glands. This fact may be well illustrated by the phenomenon of impotence. Impotence may be either psychic or glandular in origin. The eunuchs whose testicles have been removed, are examples of the latter. An example of the former is the young man about to be married who looks forward with expectation and vivid imaginings to the first sexual embrace, and who finds, upon being brought face to face with actuality that he is unable to perform the sexual act. For the cure of the impotence in this instance glandular treatment would be useless, and psychoanalysis would be in order. However, as a rule, treatment is unnecessary.

In order to represent graphically the intimate relation existing between psychoanalysis, personality and the glands, the following triangle has been devised.



CHAPTER II

THE GONADS OR SEX GLANDS

To the newspaper-reading public glands mean solely (if they would speak their minds frankly) the male gonads or testicles. Organically they are not essential. Men and animals can live long lives without their gonads, whether the latter are congenitally missing or removed in later years. Other glands, like the parathyroid or the adrenals are absolutely necessary to the life of the organism, and their removal means death. Public curiosity, however, is not whetted by them.

The various glands found in the human body determine by their normal or abnormal behavior the health or sickness, the growth or the stunting, the pleasing or loathsome appearance of the human body.

The gonads, especially the male gonads, determine the virile or womanish, aggressive or supine physical and mental attitudes of the male human animal. Upon them depends the attaining of the goal toward

which the great Viennese analyst, Alfred Adler, has beheld all human energies striving, "Complete manhood."

No medical discovery, however important it may have been for the welfare of the human race, has ever supplied one-tenth as much matter for newspaper headlines as Brown-Sequard's injections, Lydston's and Voronoff's gland transplantation methods, and Steinach's latest operation. Other reasons for the attention paid to gonads is the fact that they are the only exterior glands of the body in the male, and that the relations of reciprocal action between the gonads, the outward appearance of man and his mental condition are intimately associated. We shall, therefore, place them at the head of the list and proceed with our readers from the moderately well known to the less familiar.

The Male Gonads or Male Sex Glands

The male gonads or testicles are made up of two different glands, the seminal and the interstitial, whose tissues, however, are so closely interwoven that only recently were they differentiated. The seminal gland produces the semen, and is made up of small tubes that are lined with minute round cells

which gradually transform themselves into spermatozoa and pear-shaped cells. The spermatozoa are the reproductive cells, but the function of the pear-shaped cells has not been established. The interstitial gland is made up of small islets of large cells held together by connective tissue and found between the seminal tubes. These cells are known as the cells of Leydig.

Sperm, which is the secretion of the seminal gland, flows out of the body by way of the genito-urinary tract. The unknown secretion of the interstitial gland is poured out directly into the blood stream.

Although reproduction would be impossible without the seminal gland, sex, in every sense of the word, seems to be completely dominated by the interstitial gland. The interstitial is endowed with a stronger vitality than the seminal gland, for though exposure to X-rays kills the seminal gland it does not affect the interstitial gland. The tying or cutting of the sperm vessels causes the seminal gland to degenerate, but does not affect the interstitial gland harmfully. Finally, the interstitial gland seems to insure the nutrition of the seminal gland, and to protect it by neutralizing the various poisons likely to affect it.

The masculine sexual traits of the individual are retained when the seminal gland is removed, obliterated or deprived of an outlet, but they disappear when the interstitial gland is no longer active.

The Female Gonads or Female Sex Glands

Much less is known about the female, than about the male gonads, perhaps because of the respectively quiescent and aggressive rôles played by woman and man in their sex life. Man, having to enact the active part in love is soon driven to seek help when unable to assume the masculine attitude. Woman, on the contrary, though ignorant of sex facts, may go through life without suspecting her deficiency, or may maintain an obstinate silence caused by excessive modesty.

In order to appreciate the part played by the female gonad in woman's sex life, it is necessary to understand the structure and function of these glands. The female gonad or ovary is much more complicated in its structure than the male gonad. It consists really of three glands, the Graafian follicle, the yellow body and the female interstitial gland.

The Graafian follicle produces the human eggs which pass into the womb by way of the Fallopian

tubes, and out of the body, if not fertilized, within a few days. Besides that function, the follicles produce a secretion which flows directly into the blood stream. The yellow bodies develop in the small cavity left in the ovary whenever an egg has been let out.

The interstitial gland develops from yellow bodies growing where an egg, instead of being let out has been reabsorbed. Much less is known about the internal secretion of the various gland tissues composing the female gonad than about their equivalents in the male gonad. It has not been ascertained to what extent the yellow bodies and interstitial cells control the sexual characteristics. For instance, exposure of the gonad to X-rays causes the Graafian follicle to degenerate, while the interstitial cells, on the contrary, grow larger and more numerous. The Graafian follicle in the female seems much more necessary to the conservation of sex organs than the seminal gland in the male.

The Relation between Menstruation and Ovulation

The relation between menstruation, the periodic discharge of blood from the uterus of woman, and

ovulation, the release of a mature egg by the Graafian follicle, is thus far very vague. In the majority of cases ovulation and menstruation are simultaneous. Menstruation may take place without ovulation, while ovulation may continue after menstruation has ceased.

Experiments upon apes, as well as upon human beings, have shown that the removal of both ovaries is followed by the complete stopping of menstruation. The transplantation of part or of a whole ovary under the skin reestablishes it. However, if this transplanted ovary is again removed, menstruation ceases once more. Pflueger believes that the reason for the usual interrelation between ovulation and menstruation is due to the fact that the congestion of the ovary leading to ovulation as well as the congestion of the uterus causing menstruation are both the result of reflex action brought about by the enlargement of the yellow bodies in the ovary. The general assumption is that the ovaries produce an internal secretion which is transmitted to the blood or lymph, and which, when it reaches the tissues in the uterus stimulates the mucous membrane to activity. Fraenkel expounds this view fully, and attributes the manufacture of the internal secretion to the yellow

cells of the ovary. In addition, he holds the opinion that ovulation occurs normally about two weeks before menstruation, and that the secretion furnished by the yellow cells causes the enlargement of the uterus that takes place shortly before the monthly discharge of blood.

That the ovaries and the uterus are closely related and that therefore the function of ovulation is associated with menstruation, investigation has shown. If the ovaries are removed in the young the normal development of the uterus is interfered with, while their removal in the adult causes its degeneration, which may be averted by transplanting ovarian tissue.

Many views have been held as to the significance of menstruation, some of them claiming that it is a process of periodic purification, and others that it is a means of removing excessive nutriment from the body. Modern science favors the views that menstruation is Nature's way of preparing the soil for the reception of the fertilized ovum or egg, but the view varies with the opinions held as to whether ovulation precedes, occurs simultaneously, or follows menstruation. That it is often a determining factor in ascertaining pregnancy is expressed in the

words of Powers when he says: "Women menstruate because they do not conceive."

Pregnancy, Child-bearing and the Development of Character in Women

In the fulfilment of woman as a normal individual, pregnancy and child-bearing play no insignificant rôle. Pinard has said that women who conceive and nurse their children go through a rejuvenation of the organism, have a stronger character, greater resistance to suffering and at the same time reveal more kindness and abnegation. There are many grounds for this statement, the most tenable of which would be that since pregnancy and child-bearing are natural functions in woman, their accomplishment is only the correct expression of the laws of nature. A woman who is physically fit to bear children is in most cases willing to let Nature have her way. The woman who looks upon motherhood with dread is either physically or mentally unwell.

Concerning the attitude of woman toward child-bearing, the glands are an essential consideration. In the healthy, robust woman the thyroid, pituitary and adrenal glands are stimulated to normal activity. When she is pregnant she regards her con-

dition optimistically and looks forward with happy thoughts to the advent of her child. The neurotic woman, on the other hand, suffering from abnormal functioning of her glands is mortally afraid of pregnancy and child-bearing. She is selfish, self-centered and panic-stricken in the presence of suffering.

Pinard may be correct in his statement, yet one is tempted to ask whether the stronger character and greater resistance of the child-bearing woman are the cause or the effect of her condition. Pregnancy and suffering do not make stronger and kinder women; rather, the stronger and kinder woman will be more willing because of those characteristics to bear and rear children.

Pathological Deviations and Eunuchs

In man, as in woman, it is the positive, autonomic or involuntary nervous system which sustains life and builds up the body. These nerves are responsible for sex desires and actuate the interstitial gland. The negative autonomic nerves are the emergency danger-signals that precipitate the emission of spermatozoa and terminate the erotic desire. In woman the innervation is practically the same except that the action of the emergency nerves causing an

unconscious fear of consequences makes the woman draw within herself, and though the eroticism is not ended and gratification is not produced, a protective mechanism of frigidity is projected.

There are many departures from the normal in the innervation of the gonads of both male and female, some congenital, and others brought about by artificial means. Individuals with rudimentary gonads are examples of the congenital type, while castrated men or eunuchs illustrate the artificial type. To quote the Bible, Matthew XIX, 12: "For there be some eunuchs that were so born from their mother's womb, and there be some eunuchs which were made eunuchs of men: and there be eunuchs which have made themselves eunuchs for the kingdom of heaven's sake."

The eunuchs that are so born from their mother's womb are peculiar for their lack or for their barely accentuated male characteristics. Their generative organs are either rudimentary or atrophied. Their skin is smooth and hairless, their bodies are rounded and curved, and they speak with high-pitched voices. The pubic hair shows the female distribution characterized by its horizontal boundary line instead of

the hair reaching the navel in the usual masculine triangular fashion.

"The eunuchs which are made eunuchs of men," that is, the eunuchs that result from castration, or the removal of the testicles are effeminate in type. If a man is castrated before puberty the generative organs do not develop, the hair on the body remains scanty, the voice does not assume the masculine bass, the beard does not appear, and obesity with flaccidity of the muscles sets in. If a female is castrated or spayed, that is, if her ovaries are removed, the opposite phenomenon takes place. The breasts do not become rounded, the pelvis does not acquire the normal feminine structure, the legs are longer and the voice is deeper. In both cases, whether in the castrated male or the spayed female, the mentality if not dulled is apt to assume the characteristics of the opposite sex.

Zambacco Pasha who has made a special study of eunuchs says that they are generally typified by mental inactivity, timidity, lack of enterprise, selfishness, envy, fanaticism, mysticism,—a mixture of feminine and childish traits.

The Glands, the Hermaphrodite or the Man-Woman

Another gonado-centric type of individual is the hermaphrodite, androgyne or man-woman. Again, as in the case of the eunuchoid personality, gland deficiencies are the cause; these need not necessarily be irregularities of the sex-glands alone, as with the eunuchs, but instabilities of the whole endocrine system. In the majority of pathological deviations one gland alone is not responsible for the resulting individual, but the entire gland system, or a large part of it.

Again in males the physical characteristics are feminine. The breasts are rounded with pronounced nipples; the hands and feet are small and shapely; the muscles, soft, and devoid of masculine strength. The distribution of fat is generous as in woman. As for the sex organs, they are generally undersized, like those of a little boy; though they may reveal abnormalities in shape and size. The hair-growth is scant and the texture finer. In fine, the feminoid type is a man with very pronounced feminine traits, both physical and mental.

Homosexuality is not infrequently associated with

the hermaphrodite. Sometimes it is a natural tendency, but in many instances it becomes a cult, whether to afford new pleasures or to meet religious needs. Artists are often homosexual, not through innate desire, but to experience emotions out of the run of the ordinary. Among the Aztecs normal men were made into homosexual, or eunuchoid types by subjecting them to strenuous horseback riding. Their generative organs weakened and atrophied, feminine characteristics set in, and they became Mujerados, or women-men. (*Mujer*—woman.) From that moment they assumed female garb and mannerisms, and were consecrated in the religion of the country. The ancient Phœnicians, also, practised eunuchoidism, and the men who were thus rendered feminine later indulged in all kinds of sexual perversions with either sex. This artificial feminoidism was not the product solely of barbarous nations. In the Middle-Ages and earlier, "for the kingdom of Heaven's sake" many a monk castrated himself. St. Francis, it is well known, was one of these self-made eunuchs. It was also a common practice to emasculate the choir-boys of the chapels, so that they might retain their tenor voices for the glory of heaven.

Introversion, or shutting of the individual within himself, is characteristic of eunuchoidism. He isolates himself from the world and lives in his own desires. The mentality of the eunuchoid ranges from that of a low type to that of a high order. There have been generals, artists, scientists and men of all orders within the ranks of the hermaphrodites. In Turkey there have been eunuchs who have risen from their rank of harem-keepers to men of importance in the army.

The male woman of history is the Amazon. Though born with feminine qualities, when she reached maturity her breasts were torn off, and her female traits were suppressed. From then on she went into the battlefield together with the men, fought side by side with the bravest of them, and distinguished herself by feats of valor.

CHAPTER III

THE GONADS AND VIRILITY

As we have seen before, sexual potency or virility is intimately related to the proper functioning of the gonads and the rest of the gland system. Realizing this fact many scientists, among them Brown-Sequard, Voronoff, Lichtenstein and Steinach have performed experiments giving conclusive proof.

Brown-Sequard's Experiments

In 1889 Brown-Sequard began making experiments with extracts from the gonads of various animals. These experiments when first tried upon animals gave such interesting results that he decided to see their effect upon himself.

In May of that year he removed one gonad from a healthy two-year-old dog, chopped it up fine, ground it in a mortar with a little water and then squeezed out the fluid. He obtained about four and a half cubic centimeters of extract. He injected one

cubic centimeter of it under the skin of his own leg. He repeated the injection five times at intervals of from five to ten days. Then he made a similar extract from the gonads of male guinea pigs and gave himself five injections of it under the skin of his abdomen and his arm.

At that time Brown-Sequard was 71 years old and very feeble. Laboratory work exhausted him very quickly. He ate little and had to retire early although he usually was unable to sleep.

The day after the first injection he noticed amazing changes in his condition which improved very rapidly with each new injection. He could stand up for hours in his laboratory instead of being compelled to sit down every few minutes. He was even able to work once more in the evening. His arms and legs showed renewed vigor. By the dynamometer his biceps registered an increase of strength of twenty-five per cent. Whereas he had had to creep up the stairs previous to his injection, clinging to the railing, he could afterwards run up and down with the nimbleness of a young man. For twelve years he had never had a natural movement of the bowels. Two weeks after the treatment began he

could discard both purgatives and enemas. In addition, he was able to do intellectual work with less effort.

Voronoff's Experiment on the Ram

Spurred by the spirit of research, Voronoff performed some experiments of his own. He took a ram between twelve and fourteen years of age, which corresponds to eighty or ninety years in man. It was very unsteady on its legs and suffered from inability to hold back its urine. On May 7, 1918, Voronoff grafted immediately above the goat's right testicle, the testicle of a young ram. Two months later the animal was entirely transformed. The incontinence of urine, the weakness of the legs, and the general lassitude ceased. The carriage became proud again. The old ram looked young and vigorous. A young ewe placed with him in the stall was impregnated and bore in February, 1919, a vigorous offspring. Then the gland which had been implanted in the rejuvenated ram was removed and once more senility set in. In June, 1919, a new graft was performed, and youth returned to the ram once more. Under the influence of this second grafting he fathered a new offspring in February, 1920.

Steinach's Experiment on the Rat

Steinach used for his experiments old rats seventeen to twenty-three months of age. The signs of senility in an animal are evinced in various ways. The hair is lost. The scrotum is the first to become denuded, then the throat and the thighs. Vermin accumulates and the animal no longer cleans himself. Emaciation sets in, and every particle of fat disappears. The organs become shriveled up and anemic, the appetite decreases, the animal is easily tired, he no longer fights, the head droops, and the eyes are watery and half-closed. Sexually he manifests indifference to the female.

The rejuvenation process depends upon the age of the animal. If the rat is not very old the sperm duct is cut on one side; if the rat is very old the sperm ducts are cut on both sides. If these procedures fail, the gonads of a younger rat are implanted under the skin of the old one.

Paul Kammerer, Steinach's co-worker states: "As the first result of the operation, as soon as the wound has healed, the animal abandons its drooping attitude. It straightens itself out, opens its now clear eyes, develops a new interest in its environ-

ment, above all for the female, becomes once more active and displays a strong appetite. After three or four weeks, the beneficial effect of the functional activation becomes apparent; the animal takes on weight, a new fat layer forms, the muscles are like newly-oiled machines and no longer colorless but red, owing to the good blood stream they receive. It would be a great mistake to think that the rejuvenation by the interstitial gland merely causes a new flare-up of sexual lust. It has a chemical influence on the entire organism. For instance, the thyroid and pituitary glands, which in all animals are withered regain after rejuvenation their size and consistency. Finally, our rejuvenated rat grows new hair on his bald spot, the entire fur becoming thicker and smoother, and as the animal now cleans himself carefully, freer from parasites. The seminal vesicles and the prostate gland, which in old rats are empty and wrinkled, are now well developed and full of secretions. The scrotum which was shrunken and hairless is now covered with hair. Our rat is now ready to fight any male and conquer any female."

The Steinach operation on rats not only increased their sexual power and improved their general

health, but also lengthened their span of life. The rats he used lived from twenty-seven to thirty months. Paul Kammerer writes: "This is the more important, as when the second senility is reached the animals can be rejuvenated anew if the operation was performed on one side by operating on the other side, and when both sides have been operated upon, by implanting young gonads."

Criticisms of Steinach's Operation

Many criticisms have been leveled at Steinach's latest operation for the rejuvenation of males. It has been pointed out that in drunkards and in those infected with venereal disease or tuberculosis, the seminal glands atrophy, while the interstitial glands hypertrophy. Nevertheless, the patient is not rejuvenated. As Paul Kammerer answers: "We can hardly expect a gradual poisoning of the organism to lead to any form of rejuvenation, whatever its local influence may be."

The startling results of the Steinach operation are still a puzzle. Were it not that other observers have rejuvenated animals by that method, we would suspect that its beneficial effects were due to suggestion. After certain diseases, the spermatozoa are no longer

able to escape from the gonads. Nevertheless, no improvement has been observed in the sexual and organic conditions of such patients. Perhaps improvement might be noted if these cases were to be carefully followed up after recovery. In venereal diseases and tuberculosis when inflammation closed up the tubes of the seminal vesicles, one may very often observe a great increase in sexual desire caused undoubtedly by the fact that both the internal and the external secretions have no outlet and are both discharged into the blood stream.

The Gonads or Sex Glands in Plants

Experiments in plants show that the gonads exert a similar influence upon their lives. Budding, blooming, growth and reproduction are the results of plant procreation. Certain plants may be made to live several years longer, if their flower buds are cut off as soon as they appear. The century plant lives to a very old age in cold climates where it does not bloom for many decades. In Mexico, it blooms after ten years or so and then dies. From these observations it may be deduced that if the reproductive mechanisms of plants are destroyed there is a pouring in into the plant of some vitalizing agent, prob-

ably an internal secretion which is conducive to longevity. This is similar to the results obtained in animals by the experiments of Steinach.

Lichtenstein's Operation on the Human Being

One of Dr. Lichtenstein's patients, a man seventy years old, who did not realize what operation had been performed upon him, nine months after the operation writes as follows: "After my wound healed I went to a sanitarium to regain my strength. To my great astonishment I had erotic dreams during the night. My appetite became ravenous. Instead of being deeply depressed I now enjoyed life. I look healthy and am quite elastic for my age. People take me for a man of about sixty years, and cannot believe that I have passed the seventy-one-year mark. My difficulties in breathing have about completely disappeared and I often take walks of a few hours' duration. Instead of going to the barber's once in two or three weeks, I must now have my hair and beard trimmed once every week. I have found complete sexual gratification. My hands no longer tremble."

A year later at the age of seventy-two the man was still enjoying the benefits of his rejuvenation.

Lichtenstein mentions that not only the body hair had increased, but that some of it that came out was actually dark.

Stanley's Treatment by Injection

Dr. L. L. Stanley, resident physician of the California State Prison in San Quentin has developed a new and simpler procedure of rejuvenation than those previously employed. He takes the gonads of rams, goats or boars and cuts them into very small strips. With these strips he fills up a syringe with a needle of very large caliber, holding about sixty grains and used for injecting paraffin. He inserts the needle under the skin of the abdomen and using only one point of entrance injects one-fourth of the contents of the syringe, in four directions. This injection, if done carefully, may be painless.

The Stanley treatment was first given to a few volunteers. After twenty or thirty of them had reported to their fellow-prisoners the good results obtained, many applications were received. Up to the summer of 1921 over three hundred of them had been treated. Some of them even asked for a second and third injection, feeling that if one did good more would do better.

Eight cases of asthma were treated. Four were improved and four were cured. In four young men, ranging from eighteen to twenty-five years of age, who suffered from facial eruptions, marked improvement was noticed. Eleven tuberculous patients showed a temporary gain in weight, appetite and sexual activity. The improvement in the tuberculous patients was probably due to the psychological effect of a new mode of treatment. Any new treatment at first helps the consumptive. Sixteen mental cases treated by Dr. Stanley showed improvement. One paranoiac obsessed by an idea of persecution improved physically and became able to work.

The Effects of X-rays on the Gonads of Women

Dr. Halzknecht of Vienna treated women in the throes of a stormy climacterium or change of life by submitting their gonads to X-ray exposure. The results were gratifying. Experimenting with Steinach on female guinea pigs he discovered that when the ovaries of the little animals were submitted even to moderate X-rays the eggs were destroyed and transformed into "yellow bodies." This process makes the rejuvenation of woman simpler, for it

does not require the opening of the abdomen in order to remove the ovaries. French investigators (Bouin, Ancel, Villemin), on the other hand, report that exposure to X-rays works like castration, causing the follicles to atrophy, preventing the formation of "yellow bodies" and bringing about the degeneration of the entire sexual apparatus, including the breasts. Though the rejuvenating influence of the X-rays is still a mooted question, there is no doubt that the X-rays cause sterility both in the female and the male. Because of the sterility produced, the use of X-rays has been advocated by some as a method of birth control. X-rays have also been used with success to check severe bleeding from the uterus. The rays discovered by Roentgen have a selective action upon the female sexual apparatus and it remains for the future to definitely determine just what this action is.

The Suppression of Menstruation by Mental Factors

On two occasions we have been able to observe what seemed to be the suppression of menstruation by mental factors. Two women, one thirty-four, a widow, who at the time had a lover, the other,

twenty-two, unmarried and a virgin, found themselves forced by circumstances to step into commercial positions which are seldom, if ever, entrusted to women. Their sex was a definite handicap to them and their neurotic make-up caused them to feel that handicap very keenly.

For several months they struggled bravely with complications, which were of a nature that cannot be described here. Both finally succeeded in winning the respect of their male associates. During the period of storm and stress, when they were constantly on their guard against the sexual advances of the men about them, their menstruation entirely ceased. In the case of the older woman who had taken drugs to bring on the flow, there may be some doubt as to what brought about the return of the gonadal functions. In the case of the virgin, no doubt was possible. In both cases the menstruation promptly returned and was firmly established immediately after the business conferences which both women had dreaded, were successfully terminated. During these conferences one woman was told that she had "done as well as any man would have done." The other was told that her invest-

ments were as well protected as though she were a man.

Adler would certainly recognize in both of these cases his "masculine protest" or craving for virility, which for three months in one case, and for four months in the other, had eliminated the function whereby woman differs radically from man.

Psychoanalysis also reestablished menstruation in a girl of twenty years, who at the age of eighteen, which was about the time of its appearance, had been subjected to a brutal assault which she had never revealed to any one and which had filled her with a panicky fear of all sexual phenomena. In this case the family physician administered large doses of thyroid, pituitary and ovarian extracts, which probably helped. The gland medication was stopped when the function of menstruation was established.

In all of these cases, which have been selected because they are characteristic, the mental factor became so obvious, in the course of the analysis that there was no need of conjuring up an organic inferiority. Fear simply dammed the mental flow.

Psychic Impotence

One of the best examples of the influence of psychogenetic factors on the gonads is the fact that a man's sexuality may be very low with one woman and very high with another, who is in no visible way superior physically. In the latter case fetishes denoting peace and safety prevent the sympathetic system from causing impotence. In the former case those fetishes once present have been destroyed by age or replaced by fetishes of the disquieting kind which set the body's safety appliances working. All talk of gonadal insufficiency in cases of marked fetishism is absurd. Feeding powdered gonads or injecting gonadal extract, or performing the Voronoff or Steinach operation on a man who, totally frigid in the presence of an attractive woman, grows wildly erotic when kissing a pair of female slippers, would be simply asinine.

Some men are made partly or completely impotent, or incapable of gratifying their wives by their lack of sexual endurance, by either actual memories of incest in childhood or by repressed incest wishes which transform a perfectly attractive female into a source of paralyzing, unconscious fear.

Then there are the processes so well described by Adler in his monumental work, The Neurotic Constitution, which drive the neurotic along the path of negative safety, make him anti-social, anti-biological, anti-sexual and cause him to protect himself against woman, "the temptress," "the domineering one," "the extravagant one," "the passionate one."

Then again a secret sense of sin, based upon forgotten childhood experiences, perhaps cruel punishment for sexual curiosity or indiscretion, will assail an otherwise perfectly potent man. A man seduced by his aunt at the age of sixteen was almost completely impotent with every woman until he married. From then on lawful intercourse no longer evoked the squeamishness which used to overcome him whenever he approached a woman.

In homosexualism we must draw a very definite line between neurotic men and women who seek their own sex for safety, convenience, fear of defeat, of expense, entanglement or exposure, and the physical misfits who have either an indefinite sex, or the secondary sexual characteristics of the opposite sex, men with breasts or hairy women. Experiments made upon animals by Steinach and others show clearly that the implantation of testicles into a

female make her appear like a male, and the implantation of ovaries into a male make him act like a female. The testicle graft caused a female deer to grow horns. The ovary graft made the breast of a male deer to develop, and prevented the growth of antlers.

CHAPTER IV

THE THYROID GLAND OR THE GLAND OF EMOTION

THE thyroid gland, the source of emotions, the regulator of energy, the builder of character, the fountain-head of activity was among the first of the glands of internal secretion to be studied. The first definite work was done by Curling, an Englishman, who in 1850 while studying the idiots of Salzburg, discovered that their deficient mentality was associated with an absence of the thyroid gland. To this condition, when occurring in children, the name cretinism was given; when occurring in adults it was known as myxedema. Theodore Kocher, the great surgeon, while operating upon goiter, a chronic enlargement of the thyroid gland, particularly common in Switzerland, in the Pyrenees and in the mountainous regions of Germany, Austria and France, found that a complete removal of the gland was followed by certain symptoms. Schiff demonstrated that these symptoms could be prevented by

injecting thyroid juice into the blood or grafting a piece of the gland under the skin. Thus was established the fact that the thyroid gland had an internal secretion. To use Schiff's own words: "We may wonder if the thyroid body produces in its interior a substance which it delivers into the blood stream and which constitutes a nutritive element for another organ (nervous), or whether it act mechanically by its anatomical position. To decide between these two alternatives, it is necessary to find a means of transplanting it by grafting it into some other part of the body. If, after this has been done, the accidents resulting from its removal are avoided or reduced to a minimum, it is evident that the action of the thyroid is due to its composition and not to its anatomical relations; this will prove the thyroid to have a chemical function."

The Location and Structure of the Thyroid

The thyroid gland is in the neck, astride the windpipe. It consists of two lobes or portions, a right and a left, connected by a middle part known as the isthmus. It is usually one of the lateral lobes that enlarges, but at times the gland as a whole may increase in size. In close relation with the thyroid

are the parathyroid glands, very important structures that will be taken up later.

Comparative morphology, or that study which treats of the anatomical structures in man and animals, reveals that in the higher invertebrates and the lower vertebrates the thyroid is a sexual gland, intimately connected with the uterus. It is indeed strange that this seat of energy and emotions should be located near the region where the ancients judged the affections and soul to be. Does not the Bible speak of "the bowels of compassion" and does not Shakespeare mention the bowels as the seat of the passions? As we go higher in the scale of evolution we find that the thyroid ascends until it reaches the throat, and remains as a relay station between the passions and the intellect. Similarly we find that in literature the supposed seat of the spirit, the affections and the soul travels from the bowels to the liver, from the liver to the heart and from the heart to the pineal gland, a small structure in the brain. The fact that the thyroid gland is a sexual organ is evidenced by its enlargement at puberty, during menstruation, during pregnancy and at the change of life.

The Thyroid as a Human Accelerator

Even as the accelerator regulates the speed of the automobile, so does the thyroid regulate the speed of human activity. When the accelerator is pressed and the internal secretion of the thyroid gland is increased the condition is known as hyperthyroidism. A deficiency of the secretion is known as hypothyroidism. Hyperthyroidism is a common disease, particularly in its milder forms. None of us can escape sorrow, joy, disappointment, nervous jolts, shocks, anxiety, anger, grief, or sexual experiences; and any one of these will stimulate the thyroid to hypersecretion. Nine patients out of ten with Graves's disease (an aggravated form of hyperthyroidism) reveal such a factor as a starting point. In an even greater percentage of patients the predisposing soil is an hereditary taint in one form or another. As a rule, the patient's family history points to the existence of bronchial asthma, diabetes, epilepsy, insanity, neurasthenia, Raynaud's disease, angioneurotic edema, Graves's disease, or just plain "nervousness" in blood relatives. A type of nervous and endocrine instability is inherited as a predisposing cause. It requires but the impetus of a subacute

or an acute emotional strain to develop hyperthyroidism. Intensive study, sexual repression, obsessions, incompatibility, griefs, shocks, risky adventures, accidents, fires or other conditions where the instinct of self-preservation overwhelms the individual, produce within a short time, or sometimes at once, typical hyperthyroid personalities,—a trembling creature with bulging eyes, rapid heart, a moist skin, and an emotionally unstable nervous system.

Hyperthyroidism and Personality

An increase in the internal secretion of the thyroid gland produces such a distinct change in the behavior, temperament, character and modes of adjustment of the individual that he may be distinguished as an entity,—the hyperthyroid personality. This type is the one that rises to heights of elation or sinks into depths of despair. He is irritable, peevish, easily upset. He is never satisfied. He is in other words, the chronic kicker, who finds the summer too hot and the winter too cold, the days too bright and the nights too dark. He is wide-awake, rapid in action, fantastic in imagination, at once the dreamer, the planner and the doer,—a defi-

nite motor type, ever restless, seeking that he may find, knocking that it may open, and looking that he may see.

To hyperthyroidism corresponds a great mental activity which is often coupled with too much of a critical tendency, not infrequently directed against oneself. The mental processes are extremely speedy and the perceptions and associations are as rapid as lightning. We find an increased sensitiveness and a capacity to visualize the feelings of other people, and to sympathize, which sometimes imparts to the hyperthyroid man a sort of feminine touch. This sensitiveness may be converted into touchiness, sudden changes of mood, optimism, despondency and outbursts of anger.

The degree of emotional instability depends upon the degree of hyperthyroidism. It reaches the maximum in the condition known as exophthalmic goiter, which is due to an increased secretion associated with bulging eyes and an enlarged thyroid gland or goiter. This disease is also known as Parry's Disease, after Caleb Hillier Parry who in 1825 wrote a description of eight cases of "Enlargement of the Thyroid Gland in connection with Enlargement or Palpitation of the Heart." At times it has been

called Graves's Disease after another Englishman who in 1835 first definitely described the ailment. The Germans have named it "Basedow'sche Krankheit" after Basedow who differentiated the condition in 1840. The Italians maintain that Flajani described the disease in 1800 but their claim is unsupported by the evidence.

Knowing what we do about the causes and effects of hyperthyroidism, it is not surprising to find this condition to be common among those leading emotional lives. Pende observed that many actresses and actors present thyroid hyperactivity. Patrizi adds that it is frequently found in many musicians and poets. All of them are irritable, and emotional and subject to moods. Singers surely are not immune, and many an altercation between the prima donna and her impresario is due to too much thyroid.

But hyperthyroidism is not solely the malady of emotional aristocrats, for it is commonly found in the lower class of farmers, women who have raised large families on slender incomes, among poorly paid teachers and struggling students. Nurses in training may suddenly develop goiter, while many men develop it when confronted with the hardships and dangers of army life.

Worry about the future which creates an abnormal mental activity, restlessness, sleeplessness, lack of concentration often translate themselves into a morbid overdevelopment of the thyroid resulting in high blood pressure, palpitations of the heart, constipation, impotence and frigidity. Fatigue and great strain produce hyperthyroidism.

The Goetsch Test of Hyperthyroidism

A big neck or an enlarged thyroid does not always mean hyperthyroidism. In fact there is a form of goiter, the colloid, which indicates a decrease in the thyroid secretion. This condition is treated by the administration of the thyroid gland itself. On the other hand, exophthalmic goiter always means an increase in the thyroid secretion.

Sometimes hyperthyroidism is mistaken for psychoneurosis, hysteria, asthenia, mental instability, or tuberculosis. In order to distinguish hyperthyroidism from these conditions and from simple goiter Goetsch has devised a test. He injects one half of a cubic centimeter of a solution of one in one thousand of adrenalin chlorid. If the pulse or blood pressure, or both, rise ten points, for in-

stance, the pulse rising from 72 to 82, the blood pressure from 150 to 160, there is hyperthyroidism.

Hypothyroidism

Hypothyroidism is the reverse of the condition we have been discussing. Instead of an increase in the internal secretion we have a decrease. When the thyroid gland is removed in an animal, the skin becomes thick and dry. There is a gain in weight, the muscles become weak and growth is slow. The blood becomes poor in quality and quantity; the temperature is subnormal; the pulse is slow and weak; activity is lessened, and the actual sexual desire is diminished. Examination of the tissue shows that the cells have diminished in size.

In 1859 Schiff was the first to note that the removal of the thyroid gland in a dog was followed by the symptoms described. Gull and Orde differentiated this condition in adults and called it myxedema. In children it is known as cretinism. Horsley showed that these symptoms could be removed in animals by the transplantation of other thyroid glands. Murray and Howitz used thyroid extract by mouth and cured the disease. Other ex-

periments showed that this gland is essential for the growth of the body and brain in childhood.

Jacques Loeb of California found that by feeding very young tadpoles with thyroid very diminutive frogs could be produced. Allen observed that if a young tadpole was deprived of its thyroid gland, it was unable ever to become a frog.

The axolotl is a salamander whose habitat is Mexico. The strange thing about this salamander is that throughout its life it exists in the tadpole form, unable to undergo complete metamorphosis. Feeding the axolotl with thyroid gland causes it to throw off its gills, change its skin and tail, thus completing its metamorphosis and attaining full development.

Cretinism or Curable Idiocy

The cretin from time immemorial has been a subject of interest to society. Paracelsus was among the first to describe this condition in more or less scientific terms. The cretin has played an important rôle in literature, art and social intrigues. The buffoon, the clown, the court-jester with his cap and bells, was very often a cretin. Some of the malformed dwarfs painted by Velasquez were cretins.

In intrigues the poor cretin, born fool that he was, was used as a go-between and tool by the shrewd and unscrupulous.

To be born a cretin was to be doomed to idiocy. The discovery of the action of the thyroid gland has meant the prevention of cretinism. Formerly cretins were quite common. To-day they are comparatively rare. Success in the cure of this condition can only be assured if treatment is instituted very early in infancy.

The condition is rarely recognized before the infant is six or seven months old. It is then noticed that the child does not grow at the normal rate and is not bright mentally. The tongue is large and thick and hangs out of the mouth. Gradually as the child becomes older other signs are observed. The skin is dry, thin, rough, scaly, yellowish or waxy. The face is large and bloated; the brow is wrinkled; the eyelids are puffy and swollen; the eyes are bleary; the nostrils are wide; the nose is flatly depressed giving it the name of *saddle-nose;* there is drooling about the mouth. The ears are large, outstanding and erect. In short, it is the picture of the comic-tragic idiot.

Professor Falta describes a four-and-a-half-year-

old cretin as follows: "Head at birth already large. Speech up to second year of life consisted of the simplest words only, such as Ta-ta, Ma-ma; and since this time the child has not spoken much otherwise. Head extremely large. Very low forehead, eyes standing wide apart. Saddle-nose; thick broad tongue that protrudes from the mouth. Cheeks very thick, throat also very thick and stubby. Thyroid not palpable. Thick hair on back. Skin of the body springy, elastic; hands and fingers chubby. Abdomen much distended. The child often stares into space for a long time, but at times is lively and cries loudly. No trace of speech. Puts all objects into his mouth. Impressions of hearing entirely absent; no reactions of the eyelids to sound."

Myxedema and the Hypothyroid Personality

Myxedema, as has been stated before, is a disease of adults. Women are more frequently attacked than men, the ratio being about six to one. The condition has been found in several members of one family. Sometimes it is the end result of a previous hyperthyroidism. The thyroid having been overworked degenerates, and instead of oversecreting produces a secretion poor in quality and less in

quantity. Cases of myxedema in one sister and exophthalmic goiter in another sister have been reported.

Ord described this myxedematous condition as characterized by a marked increase in the general bulk of the body, a firm, inelastic swelling of the skin which does not pit on pressure; dryness and roughness which tend with the swelling to obliterate in the face the lines of expression; imperfect nutrition of the hair and local tumefaction of the skin. The physiognomy is altered in a remarkable way; the features are coarse and broad; the lips thick, the nostrils broad and thick, and the mouth is enlarged. Over the cheeks, sometimes the nose, there is a reddish patch. There is a striking slowness of thought and movement. The memory becomes defective, the patients grow irritable and suspicious and there may be headache. In some cases there are delusions and hallucinations, leading to a final condition of dementia.

Thyroidism is not a static condition, but variable in character. The hyperthyroidism of to-day may change into hypothyroidism to-morrow. It is therefore not surprising to find that the personality of an individual will reveal the signs of a decreased secre-

tion engrafted upon those of a former increased secretion. Thus we will have these individuals in transports of joy or in the throes of gloom. Osler reports a case of a young man in whom both diseases existed at the same time. This man became bloated and increased in weight enormously during three months (signs of hypothyroidism), then had rapid heart with tremor and active delirium (signs of hyperthyroidism) and died within six months of the onset of the symptoms.

Thyroidism and Psychoanalysis

Jelliffe reports the most illuminating case of goiter caused solely by an internal conflict of fear, worry and indecision. A young woman, married to a rather weak husband, had an affair with her family physician and became pregnant. She began to worry as to whose child it was, and especially whom it would look like when it grew up, what her husband would think, whether he'd drive her out of the home. Right then and there she had her first slight attack of goiter and tonsillitis. She was like all hyperthyroid individuals extremely agitated and nervous. When the child was born, and it proved to have

blond hair and blue eyes, like her husband, the goiter slowly disappeared.

Four or five years later, the goiter returned. Jelliffe, who treated her at this time, psychoanalyzed her and found that for a time she had been in a quandary. A lawyer she had met socially was making ardent love to her, begging her to let him secure a divorce so that he might marry her. Her dreams revealed that she did not have implicit faith in him, had doubts about his generosity and real intentions, and wondered whether after parting from her husband he would not leave her stranded. The result was a derangement of the energy gland of the organism, and the consequent development of hyperthyroidism.

In summing up the case Jelliffe says: "Many human beings are caught in just this kind of a dilemma, yet hyperthyroid reactions do not develop at all. I can only say, *So be it.* Is this hyperthyroidism alone conditioned by the factors I have hurriedly sketched? I do not think so. There are constitutional factors which are a part of the structures. The patient wants, and yet does not want to run away with the dark-haired, brown-eyed man and sacrifice the husband and the daughter. Can she

stand it? She cannot. Her physical disease is her conscience. . . . We must straighten out her moral conflict. Removing her thyroid does not do this. . . ." The cause of the hyperthyroidism is psychogenetic and the only way to relieve the condition is by psychoanalysis.

Another example of psychic thyroidism is a case which came under our observation. At thirteen the patient who was then an only child felt that life was not worth living because her mother gave birth to a baby girl. Until then she had been the center of interest. Now the baby monopolized the attention of the doctor, the parents, the visitors and the servants. She suddenly developed mumps and soon after a swelling of the neck in the thyroid region. Gradually these conditions subsided. At the age of twenty-six this same girl, upon discovering that her husband had deceived her, reacted with another attack of mumps followed by a goiter.

Analysis showed that she was suffering from a feeling of uselessness and of the futility of life. She was discouraged and incapable of making any effort to adjust herself to her environment. Her goiter persisted until she secured a divorce and then the swelling disappeared without any medication.

Thyroidism and Insanity

On visiting the wards of the Belle Air Asylum near Geneva, Switzerland, N. R. Phillips was impressed by the great number of patients suffering from goiter. There were thirty-six per cent for both sexes. Upon his return to England he made a survey of all the patients in St. Andrew's Hospital, Northampton. The result was that one patient out of every eight showed a thyroid enlargement. His series of cases showed that the type of psychosis or insanity is influenced to some extent by the form of the disturbance in the thyroid gland. For example, hyperthyroidism is usually associated with states of excitement and agitation, such as manic-depressive insanity; whereas hypothyroidism is more often associated with states of apathy and indifference, such as dementia præcox.

The treatment of the psychoses associated with goiter depended upon the type of disturbance in the internal secretion of the thyroid gland. If there was a decrease in the amount of the secretion thyroid extract was administered. If there was an increase in the amount of the secretion psychotherapy was employed.

CHAPTER V

THE PITUITARY GLAND OR THE GLAND OF GROWTH

GALEN in the second century believed that the pituitary gland separated the phlegm from the brain and discharged it through the nose. This theory was accepted until Scheider in 1662 showed that the nasal secretion was not discharged by the pituitary gland. The first real work was done by Marie in 1889, who associated an enlarged pituitary with acromegaly, a disturbance of growth characterized by an increase in the size of the trunk, face and hands which may lead to gigantism. Previous to this time the pituitary was considered a rudimentary organ, a vestige, a non-functionating cerebral appendix. In 1898 Howell extracted an active secretion from the posterior part of the gland. The anatomy of the pituitary was worked up by Swale Vincent who found in it structures similar to those found in the thyroid, the thymus, the adrenals and the gonads. Schafer added to the anatomical knowl-

edge, and especially showed the great blood supply possessed by this organ. To this was added the work of Tilney in 1911, which gave a clear insight into the minute and detailed structure. However, it was Harvey Cushing of Boston who, in 1910, produced the epochal study on the pituitary. In this work he gave us the modern conception of the physiology and the clinical manifestations.

The Pituitary—What it is and What it does

The pituitary is a small gland, the size of a pea, weighing one-sixtieth of an ounce and located in the sella turcica or Turkish saddle, a bony conformation at the base of the brain. The pituitary has been called a brain within a brain, with a miniature skull (the sella) of its own within the skull. The pituitary consists of two portions, an anterior and a posterior. These two parts are different in development, in structure and in function. The anterior part is developed from the same root as the mouth; the posterior, from the nervous system. The anterior lobe affects growth and development and is necessary to life; the posterior lobe is concerned with the assimilation of starches, sugars and fats, influences fat

formation and affects the development of the sexual organs.

Complete removal of the pituitary in dogs and cats is followed by death within from ten to forty-eight hours. Incomplete removal prolongs life anywhere from one week to one year, depending upon how much of the gland is left behind. The removal of the anterior lobe is as fatal as the removal of the whole gland. The partial removal of the anterior lobe gives rise to hypopituitary symptoms, demonstrated by a deposition of fat in the body, falling of the hair, an interference with growth, an atrophy of the testicles or ovaries and a decrease in the libido

From the posterior lobe a substance known as pituitrin is obtained. The injection of pituitrin under the skin causes a rise in blood pressure, increases the flow of urine from the bladder, stimulates the uterus to contraction and increases the flow of milk from the breasts of nursing mothers. At the International Congress of Medicine in 1913 Sir Edward A. Schafer of Edinburgh staged an interesting experiment. He brought a lactating cat, cut off the nerves leading to her mammary glands and injected the posterior pituitary extract (pituitrin) into a vein of the ear. Within a few seconds

milk spurted from the teats of the cat. This does not prove that the pituitary has anything to do with the secretion of milk, but it does show that pituitrin contracts the muscles of the breast as it contracts the uterus in delayed labor, or the muscles of the intestines in certain cases of intestinal paralysis.

Hypopituitarism, Dwarfism and Infantilism

A deficiency in the secretion of the pituitary gland produces incomplete development. The figure of the resulting individual may be that of a child, but when stripped, the outlines are those of an adult. The head is small, the trunk is well-formed and the skeletal structure is in proportion. There may be no growth of facial or abdominal hair and the arm pits may be bare. The sexual organs, though small, are in proportion to the size of the body. The mentality is normal. In short, these are the miniature men or women, the freaks of nature without whom no circus is complete.

Another result of decreased secretion is the hibernating fat boy so often seen in the type that just lives to eat and sleep. He is slow physically and mentally. The body is obese, the fat being distributed over the lower abdomen and the lower extremities. The

sexual organs are rudimentary. The skin is fine, smooth and hairless. The temperature is subnormal, the pulse low, and there is a general state of inertia. If the disease sets in after the child has grown up, there is a reversion to infantalism, the patient becoming fat and the sexual organs diminishing in size.

In the female the external sexual organs are small, while the internal organs, the ovaries and uterus may remain undeveloped and even absent. Sometimes the uterus cannot be felt at all upon examination, and there may be no menstruation. Irregular menstruation is very common. The pubic hair may change from the characteristic female type bounded by a horizontal line and limited to the mons veneris, to the male triangular type ascending on the abdomen toward the navel. The voice becomes harsher and harsher, the libido is decreased and frigidity may develop.

In the male the penis, the testicles and the scrotum remain small. Sometimes the scrotum may hang in folds resembling the female vulva. The pubic hair, if at all present, shows the characteristic female distribution. The voice does not change and remains effeminate in tone. The breasts become en-

larged; the hips and thighs are curved in the female manner. The sexual craving may disappear and impotence may develop. Quite often these individuals become passive homosexualists, or males who play the female rôle in fellatio. Mentally they are retarded and present inferiority complexes.

Hyperpituitarism, Acromegaly and Gigantism

Berman in describing the individual suffering from an excessive amount of pituitary secretion states: "If the overaction of the gland happens after puberty when the long bones have set, and cannot grow longer, a peculiar diffuse enlargement of the individual occurs, especially of his hands and feet and head. The nose, ears, lips and eyes get larger and coarser. As these people are rather big and tall to begin with, the effect produced is that of a heavy-jawed, burly, bulking person, with bushy, overhanging eyebrows, and an aggressive manner. For there is, too, something distinctive about their mentality which has been as often portrayed as those of the pathologic giant. Rabelais' most famous character, Gargantua, belongs to the group. We recruit more drum-majors than prime-ministers from among these people. They often suffer much

from torturing, boring headaches, and a consequent despondency and feeling of hopelessness which colors gray the entire spiritual spectrum."

Acromegaly and gigantism are very similar in nature, the former occurring later, while the latter earlier in life. The difference between the two is a matter of degree. The tall men of the circus sideshow all show enlarged pituitary glands, which can be determined by X-ray pictures of the base of the skull. Unusual rapidity of growth in the young, with a customary startling strength, should be looked upon with suspicion. Many a youthful Goliath develops later into a weak, helpless epileptic, for often pressure from the enlarged gland causes convulsions.

Dyspituitarism

The terms hyperpituitarism and hypopituitarism were employed because they were convenient, but a strict differentiation between the two is often impossible. Sometimes the one is the cause of the other and both may exist together in the same individual at the same or different times. Furthermore, at times there is no over or under secretion, but a perverted one. To this condition the name dyspituitarism has been given. This term is an ex-

cellent one and may be adopted for the inclusion of both hyperpituitarism and hypopituitarism, using as limitations, acromegaly or gigantism on the hyper side, and infantilism and drawfism on the hypo side. The limits themselves should be excluded. The importance of defining and limiting the range of the term dyspituitarism is of great therapeutic significance, for if only those cases are included which come within the suggested field, therapeusis will be beneficial. It is only these middle cases which can be helped by gland therapy. When a case has gone as far as gigantism or marked infantilism, not much can be done in the way of cure.

It must be understood that a case of dyspituitarism is rarely one of pure hyperpituitarism or hypopituitarism alone, but rather a combination of the two, usually in addition affecting other endocrine glands, often producing a pluriglandular disturbance. Dyspituitarism is dynamic. The usual course is an initial enlargement of the gland, accompanied by the consequent signs of hyperpituitarism. The signs of the hyper stage remain, though the hypersecretion itself may cease, due to ensuing destructive changes in the enlarged gland. This degenerative process will now give way to hypopituitarism and the signs

of decreased function will supersede. Therefore we will have cases of hypopituitarism displaying symptoms of a bygone hyperpituitarism. It is truly these dynamic conditions that should be termed dyspituitarism. The terms hyperpituitarism and hypopituitarism should be relegated to the static extremes of gigantism and infantilism.

The Pituitary Headache

Headache is an ailment common to all mankind. The causes are numerous and varied. In the March 15, 1922, issue of *The New York Medical Journal,* Dr. John A. Glassburg describes the pituitary headache and reports two cases which were referred to him for treatment of the nose and throat, one in a child and one in an adult. In both cases the nose and throat were innocent and the pituitary was at fault.

The case of the child was a girl, thirteen years old, who complained of headaches for the last two years. The patient complained of headaches located over both sides and over the front of the head. There was no pain on pressure. In addition she complained of shooting pains in the ears. Upon questioning it was discovered that she felt very sleepy most of the

time, being overcome every afternoon with a feeling of lassitude, that she became markedly fatigued on slight provocation, and her school work was not up to the mark. In addition she had gained thirty pounds in the last eighteen months. She was very shy, blushed easily, and was very sensitive about her weight.

"She began school at six and reached the 6A grade at twelve with no difficulty, but with the onset of her headaches her school work became poor and she was demoted twice. As yet she has not menstruated. Examination of the nose and throat showed nothing wrong. Physical examination revealed a girl five feet in height, weighing 145 pounds, the adiposity being relatively well-distributed. The skin was smooth, delicate, puffed and somewhat dry, with a slight loss of elasticity. The complexion was of the peaches and cream variety. The hands and feet were rather small, the fingers pudgy, and the nails thin and small. The pulse was 62 (low), the temperature 98 (low), and the blood pressure 104 (low). In summary, the case presented the typical symptomatology of a perverted pituitary secretion, frontal and temporal headache, general lassitude, muscular weakness, small stature, adiposity, delayed

menstruation, lymphoid overgrowth, mental retardation, low temperature, low pulse, low blood pressure, poorly developed teeth, bones and nails, and an enlarged sella turcica (as shown by X-ray)."

The adult was a woman of thirty-five. She had complained of headache for the past six years. Hoping to obtain relief she had undergone about six nasal operations but they proved unavailing. "The patient complained of headache which was referred to both temporal regions and was keenly felt as a constant, boring dull pain in the mid-region of her forehead. Upon questioning it was brought out that she suffered from drowsiness, numbness of the hands and feet, backache, muscular weakness, loss of strength, marked fatigue on slight provocation, fainting spells and a rapid gain in weight, amounting to thirty-five pounds in the past year. She had begun to menstruate at thirteen years of age, flowed from four to five days at a time, and was markedly irregular in her periods. At times the flow was scanty, just spotting, and at other times it was copious. Examination of the nose and throat showed no cause for the headache. The teeth were small, grooved, and spaced. The woman was five feet three and a half inches in height, and weighed 190

pounds. The eyebrows were bushy and the eyelashes were thick. There was a slight amount of hair on the upper lip. The chest and abdomen were covered with a fuzz of hair. The pubes showed the masculine vertical distribution, the hair extending to the navel, forming a pyramid on the lower abdomen instead of the female distribution limited to the mons veneris. The hands and feet were small, the fingers short and stubby. The sexual apparatus was normally developed, but the patient revealed a lack of erotic emotionalism, taking no interest in intercourse, participating in the act out of marital duty."

The treatment of the headache in both of these cases was a simple matter, for the treatment of dyspituitarism is specific, and the specific is the pituitary gland. Both of them were given pituitary extract by mouth. In a short time the headache disappeared, and there was a reduction in weight and an increase in activity.

The Pituitary Personality and Psychoanalysis

Hypopituitary persons when the deficiency begins in infancy never seem to emerge from that period of their life. They are childish, capricious, lacking

in inhibitions. They pass readily from periods of torpor into periods of mental excitement, and not infrequently exhibit signs of what various authors have called "moral obliquity." In addition, not a few have epilepsy or epileptoid disturbances. Dr. Tucker, in summarizing 200 cases of epilepsy, found that 63 showed some pituitary disturbances, while 28 of them inclined toward the hypo type. He adds that feeding these patients with the pituitary gland extract "resulted not infrequently" in a cure. The male hypopituitary type usually is the congenial homosexualist or androgyne who is proud of his body devoid of hair, his face that needs no shave, his large breasts, his curved hips and shapely ankles. Sometimes they dress in the garb of the opposite sex and are known as transvestities. The female tries to preserve her babyhood. When she finds that she is developing into a woman, she puts forth a strenuous effort to keep what she believes to be her childish charms. Other hypopituitary females who possess the secondary male features have inferiority complexes. This sense of inferiority is probably due to the growth of hair on the upper lip, the chin and body. Woman may admire the manly chest of the hairy ape, but she does not care to possess it.

Even the normal woman, no matter how beautiful, particularly if she is a brunette, has distributed here and there a few stray hairs, usually placed at a site where they can be easily detected. To remove these she is willing to suffer the pain of epilation, and expense is no object. Because of this female sensitiveness "beauty specialists" and "beauty parlors" do a thriving business.

CHAPTER VI

THE ADRENALS, GLANDS OF PUGNACITY

NEAR the kidney, and slightly above it, two small bodies weighing about one-seventh of an ounce each are found. They are small, it is true, smaller than some of the other glands of internal secretion, and yet they, with all their diminutiveness, are responsible for the success or failure of an animal or human being in combat against equal or superior opponents. To see a dog with its paws and haunches firmly poised ready for action, ears sensitive to every sound and eyes fixed with the intensity of defensive or offensive attention, as the case may be, is to observe an animal whose adrenal glands have mobilized him for attack. To watch a cat with its fur on end, its tail erect and nervously quivering, its back arched and its chest convulsed with a volley of hisses, is to look upon an animal whose defensive mechanism, centered in the adrenals, has prepared it for action,—to fight, if sufficiently stimulated, to

flee if the adrenal secretion of the glands inspires it with fear. Perhaps, to a great extent, the adrenals in primitive man were responsible for his pugnacious nature, and their efficient functioning for the permanence of the race through its age-old vicissitudes.

Form and Functions of the Adrenals

It was in the sixteenth century that the great anatomist Eustachius discovered the adrenal bodies. In composition each adrenal gland is a double gland, so that we might say that the adrenal bodies are composed of four parts. Each gland has the shape of a minute cocked hat, and it is yellowish in color, like fat. For a long time science looked upon the adrenal glands as a part of the fatty sheath of the kidneys, and it was recently, comparatively, that their function and importance were determined. The two parts of the adrenal glands possess two different secretions: one, the medullary or marrow-like body, secretes adrenalin, while the cortex, the other part, has a vitally necessary secretion that so far has not been definitely ascertained.

In the eighteenth century Cassan, while studying the adrenal glands found that those of the negro were larger than those of the European, and be-

cause the cells were colored brown with chromic acid he came to the erroneous conclusion that they controlled the pigmentation of the skin. Recently, when Cassan's view was discussed at the International Congress of Eugenics, another observer, whose research substantiated the fact that the glands of the negro were really larger, concluded therefrom that relationship did not exist between the color of the skin of the dark and the white man, but rather between their respective genital organs.

The Adrenals and the Child-Woman and the Boy-Man

The size of the cortex of the adrenal glands varies in animals as well as in human beings, according to their sexuality and pugnacity. The reader may ask, "Why with the sexuality, and what relation is there between the adrenals and the sex glands?" There is a very intimate relation between them, for close study of the origin of the adrenal glands in vertebrates demonstrates that the cortex of the adrenals springs from the same patch from which are derived the ovaries in the female animal, and the testicles in the male. What is more, if there is any abnormality, whether prenatal, or after birth, in the

adrenal glands of an individual, inversions and perversions result. In certain cases there are processes involving the adrenal cortex that bring about almost miraculous changes in the being thus affected,—so removed are these changes from the natural course of things. Little girls of from two to four years whose adrenal cortices function abnormally in certain directions will manifest a precocious puberty that is astounding. Their little breasts swell and become rounded, hair springs under the armpits and in the pubic region, menstruation sets in, and in the course of an incredibly short time they will develop into miniature women. Boys whose cortices are thus affected evince symptoms of manhood. Their mustache and beard sprout, they become stocky and resemble little men in physique. Their sexual power develops accordingly, and at the age of seven a boy may have the virility of a man in his prime. What causes these remarkable changes, this premature bursting into the realm of manhood? It may be partly explained by the knowledge that the cortex of the adrenal glands produces an internal secretion that is influential in bringing about maturity. Such phenomena as the child-woman and the boy-man

may be due to too early a pouring of the secretions into the fluids of the body.

Virilism or the Male-Woman

If the function of the adrenal cortex is disturbed when complete maturity has been attained, changes of a different order take place. If a tumor of the adrenal cortex is developed in a woman, virilism is the result. Virilism means the conversion of a woman, physically and mentally, into a man,—that is, as far as secondary characteristics are concerned. Her body becomes covered with hair, a mustache and beard appear, her muscles lose their softness and become strong and hard like those of a man, her voice changes,—in short, she looks and behaves more like a man than a woman. Psychologically, also, she is not the same. No longer is she occupied by the beauty problems of femininity.. She goes for her daily shave, if necessary, with the matter-of-factness of a man, and is not at all concerned with the anomaly of a beard on a feminine face. Her new temperament renders her immune to the æsthetic sufferings that would otherwise have resulted from her new condition.

The Adrenals and the Brain

An important function of the adrenal glands is their control of the complexity and number of the brain cells in the human being. Again, it is the cortex that controls the brain potentialities. Before the birth of a child, when it is still in its mother's womb, the adrenal glands of the human embryo are very large. In the second month they even exceed the kidneys in size, being twice as large as the latter. This disproportion is due to the enlargement of the cortex beyond the size of the medullary portion of the adrenals. It occurs only in human beings and not in animals. Were this increase in the growth of the cortex not to occur, the result would be a brainless, mentally deficient being.

So much for the function of the cortex section of the adrenal glands. The medulla, the internal secretion of which is called adrenalin, is of vast import in the human mechanism. It is this part of the adrenal glands that gives them the name of glands of energy or pugnacity. It is to the medulla that we owe the survival of the fittest, for it is the action of adrenalin upon the blood that arouses the powers of resistance and mobilizes the human

organism to confront odds. The upshot of experiments made on the medullary section and its secretion has been that blood pressure is controlled by the discharge of adrenalin into the blood. During an emotion such as fear, rage or pain, the medulla pours its secretion into the blood-stream, causing an immediate tension in the nervous system. Other secretions are stimulated to action. The liver discharges more sugar into the blood which ascends from the vital organs to the brain and the muscles. The whole organism is keyed up to the highest pitch. Every sense is sharpened. The eye is more discerning, the ear more alert, the pulsations of the heart are stronger and more rapid. The advantages of the action of adrenalin are obvious.

The James-Lange Theory of Emotion

Almost simultaneously, and in recognition of the part played by internal secretions in emotion, both James and Lange, though separated by miles of ocean, formulated theories of emotion that coincided to a remarkable degree. In brief, they were of the opinion that it is not, let us say, the emotion of fear that causes the discharge of internal secretions into the blood-stream, but that it is the functioning

of the glands, upon being stimulated by an unexpected event that causes fear. In other words, a frightened cat does not hiss and spit because it is afraid; it fears because the discharge of adrenalin keys up its organism and causes it to react as it does. That adrenalin is instrumental in endowing an animal with courage has been determined by the curious fact that pugnacious, aggressive animals have a greater supply of adrenalin than timid, shrinking ones.

Cannon's Experiment on Emotion in Cats

Professor Walter B. Cannon of Harvard University has done comprehensive work on the activity of the adrenal glands in emotional excitement. He made use of the natural enmity between two animals, the dog and the cat. He placed the cat in a holder near a barking dog, repeating the experiment with various cats. Some of the cats showed no reaction at all, being entirely indifferent to the presence of the dog. Others, on the other hand, evinced the typical feline fear. Samples of blood were taken from the cats before and after fear had set in. The sample taken before was known as "quiet blood." The sample taken after the emotion

was labeled "excited blood." Upon examining the specimens it was found that there was an increase of adrenalin in the "excited blood." As we have seen before, the adrenal glands discharged their secretion into the blood of the cat confronted with the inimical stimulus of the dog, mobilizing the former for action.

The Nervous Generation and Adrenal Degeneration.

In our hectic age the adrenal glands are called upon to function at every step we take, at every task we accomplish. Take, for instance, such a simple thing as paying a friend a visit a few blocks away from one's dwelling. If we live on the top floor of a modern apartment, we take the elevator to lower us to the street, and we have our first shock. At the rapid descent of this modern contrivance our heart beats faster; we feel a strange, unpleasant sensation in the lower region of the abdomen; we experience a sort of sinking fear. The adrenal glands are at work. Then, as we cross the street, the angry honking of an automobile horn threatens us with death under the wheels of the machine unless we are immediately prepared to avoid the im-

pending danger by the correct functioning of the adrenal gland. Our senses are sharpened, and before we know it we have reached the haven of the sidewalk in all safety. The adrenals have conquered. As we walk placidly, perhaps glancing into the pages of a magazine or contemplating the display in the shop-windows, we are suddenly jolted violently by some individual who, in the stress of hurry, disregards the rights of his fellow-beings. At first anger seizes upon us. The adrenals prepare for the onslaught. The blood surges to the face, the temples throb, the heart palpitates, the fists clench, the teeth are set . . . we are ready to attack. The adrenals have poured their secretion into the blood. So it is with the life of the gregarious modern, blessed with all the conveniences of civilization.

The demands put upon the adrenals are so many and so varied that it is to be expected that a deterioration will follow. When too great a stress is laid upon any organ of the body it is overworked, and as a result, first there is hyperactivity, then decreased activity, and ultimately degeneration, with no activity at all. Although it is true that the cave man had to be on the alert every moment of his

time, whether to keep himself from the toils of a wild beast, or to protect his mate from the advances of rival men, he was equipped for all emergencies by his natural, unspoiled state. He was free in his physical and mental life. He had no inhibitions inculcated by education, no repressions of natural needs caused by the demands of morality or religion. With the modern matters are very different. Together with the artificiality of his surroundings he has a host of codes, ethical and moral, to observe, many of which are distinctly against his natural inclinations. With every desire that he has to leave unfulfilled, an internal combat takes place,—a struggle between his natural wishes and the legitimate gratifications allowed him by society. Is it any wonder, then, that all this fighting against external odds, as well as with oneself, results in cowed, craven individuals, fatigued at the slightest exertion, sensitive to all changes of the elements and fearful of enterprise?

The Adrenal Personality or the Neurasthenic

To such products of our modern age the name of neurasthenics has been given. Their description is that of those men or women who suffer from ad-

renal insufficiency or degeneration. They cannot be called truly ill, and yet they are not well in the full sense of the word. Physically, the blood pressure is low, the heart is subject to palpitation, and the hands and feet are always perspiring. They are also the victims of hysteria, and are otherwise marked by emotional instability. At night they cannot sleep. A ruthless insomnia pursues them, and yet, when they are awake, they are never devoid of a languid, weary feeling. They are wrecks caused by the conditions of to-day. Scientific investigation came to the conclusion that neurasthenia is the malady of modernity, and, indeed, that conclusion may well be substantiated. There are more neurasthenics in those countries most advanced in modern methods and luxuries than in those marked by almost primitive conditions. As a cure for neurasthenia change of climate, rest, and absence of excitement are advised.

Shock, Collapse and Restoration

It has been determined in many cases that neurasthenia, often culminating in nervous breakdown, is really caused by insufficiency of the adrenal supply. In an experiment Crile subjected nine normal

cats to continuous exertion for long periods, after which four of them were killed immediately, three were allowed a period of rest, one was anæsthetized for two hours, and one was given gas-oxygen. Upon examination, lesions in the brain, the suprarenal glands and the liver were discovered. Thus we see that prolonged fatigue causes a change in the activity of the adrenal glands. Comparing the fatigue of the cats to the daily exhaustion of a human being in present-day environment, we may form an idea of its effect upon his adrenal glands.

According to Crile: "The man in acute shock or exhaustion is able to see danger, but lacks the normal muscular power to escape from it; his temperature may be subnormal, but he lacks the normal power to create heat; he understands words, but lacks the normal power of response." In other words, he cannot transform thought into action; he cannot transform potential into kinetic energy.

Hemorrhage is the surgeon's bugbear. It is the most important factor in producing what is known as surgical shock. Crile found that the injection of adrenalin caused a contraction of the blood-vessels and checked the flow of blood. If injected before the operation, it gave "a clear field of

operation," that is, a clean, bloodless area. In addition, adrenalin quickens the heartbeat, thus tending to overcome collapse and restore the human being to normal.

Asthma and the Adrenals

Asthma is a distressing ailment. Any measure that may relieve the attacks is well worth studying. It is well known that physical and mental fatigue influence asthma. The attacks occur as a rule in the evening or during the night, when the work of the day is over. Fright has been reported to relieve attacks of asthma. Hurst of London reports the case of a man who while driving an automobile downhill was seized by a severe attack of asthma. The brakes refused to work. A stone wall was ahead. At the very last moment he succeeded in gaining control of the car, and when he drew up he found that he was breathing with perfect freedom. The attack of asthma had been cut short. This was probably due to the stimulation of his adrenal secretion caused by the fright.

The use of adrenalin in the treatment of asthma is not a new procedure. Many an attack can be

alleviated by the injection of from five to ten drops of a one in one thousand adrenalin chloride solution.

Exercise also helps to relieve attacks of asthma, for with exertion the adrenal glands are stimulated to pour adrenalin into the blood stream, thus creating greater energy.

The Adrenal Personality, Neurasthenia and Psychoanalysis

Individuals suffering from adrenal disturbances present characteristic psychic symptoms, the most common of which are fear, depression and obsessions. The depression may become so severe as to lead to suicide. The fear not infrequently manifests itself in physical symptoms. People afflicted with this kind of fear complain of various bodily ailments and have a great dread of disease, particularly of paralysis and insanity. They worry themselves into moods and foresee cerebral hemorrhages and lives spent in insane asylums. Psychoanalysis alone in these cases is insufficient, for though it may explain the symptom, it does not touch the endocrine base.

Helen A. was nineteen years old. She felt depressed and afraid when in crowds. Tired physically

and mentally, she wanted to withdraw from the world and attempted to enter a convent. However, she did not qualify. This brought about an even greater depression and she attempted suicide by drinking tincture of iodine.

Examination revealed nothing particular except low blood pressure, low pulse, and a temperature slightly below normal. Her appetite was poor and she was subject to attacks of diarrhea, a symptom of adrenal insufficiency. There was a feeling of weakness, malaise, and general debility. She lacked confidence, and when speaking would turn to her mother for approval.

A diagnosis of adrenal insufficiency was made and an adrenal extract was administered. Gradually her depression subsided, suicidal tendencies disappeared, and she gained in strength and weight.

Henry G., twenty-eight years old, suffered from a pronounced inferiority complex. In his office he thought that people looked down upon him for inefficiency, when, as a matter of fact, he was doing good work. Among his friends he was reticent and anti-social. He was always considered delicate, refined, and in youth had been held forth as a model for the other boys.

Psychoanalysis effected a temporary cure. When analysis failed to help any longer adrenal extract was administered. There resulted a marked improvement in his carriage, the tone of his muscles heightened, and there was a self-assertiveness that had not previously existed.

Both cases quoted above showed a marked degree of garrulousness. This is typical of neurasthenia and as a rule is attributed to self-love on the part of the patient. However, it is only the desire to discuss and interpret the ailment with the object of getting rid of them.

Once more we have a vivid example of the interrelation existing between the glandular personality and psychoanalysis. Psychoanalysis is useful in explaining the psychic complexes, and glandular therapy is necessary in correcting the endocrine disturbance which is responsible for the mental aberration.

CHAPTER VII

THE THYMUS, THE PARATHYROIDS AND THE PINEAL GLANDS

THERE is not one of the endocrine glands that has been so much shrouded in mystery as the thymus, not because it has sought to conceal itself, but because, by its capricious variability it has played so many pranks with the scientist that even to this day its exact functions have not been definitely determined. Some anatomists claim that it is most essential prenatally, and therefore dub it the "gland of childhood"; others claim that it fulfils its function with the onset of puberty, and therefore apply to it the name of "puberty gland"; still others claim that it is active throughout life. Most of the evidence, however, seems to support the second of these views.

The Thymus, the Gland of Youth

The thymus gland is a brownish mass, soft and spongy, situated in the chest, covering the upper

portion of the heart and overlapping the vessels at the base. Microscopically examined, it contains cells similar to the white corpuscles found in the blood, while scattered among these white cells there are staining cells somewhat similar to the colored bodies in the adrenal glands. These corpuscles discovered by Hassal and therefore named after him Hassal's Corpuscles are more numerous in the fœtus and the infant than in the child or adult. They are believed to be the source of the internal secretion of the thymus. Besides being more numerous in early life, it seems that they also preponderate in carnivorous, rather than herbivorous animals.

The Thymus and the Gonads

All glands are more or less interrelated, and most of them seem to show a close association with the gonads, which act as a pivot about which all the other glands circle. It has been shown that the thymus dominated childhood, its chief function being that of retarding the activity of the testes in the male and of the ovaries in the female. When the thymus function decreases, the gonads have the ascendancy in the dominion of the human being. Castration gives the thymus a longer lease of life.

It does not atrophy readily. On the contrary, the effect seems to be greater growth. If the thymus is removed, the gonads develop more readily. There seems to be also some verity in the claim that it is the thymus that makes the child retain its childishness. The more developed and active the thymus the less the gonadal function and the development of the individual into maturity; the smaller and more passive the thymus, the greater the sex activity and maturity. Prenatally the thymus is very large in proportion to the other organs of the fœtus. In childhood between the ages of one and five it is approximately thirty-three grams in weight; between eleven and fifteen its weight rises two or three grams; but from then on there is a continued decrease. At the age of twenty it dwindles to about twenty-five grams, while in old age its weight is no more than about six grams.

Gudernatsch's Experiment with the Tadpoles

The importance of the thymus in development and maturity may be shown by quoting the experiment made by Gudernatsch. He found that by feeding thymus extract to young tadpoles, their growth was increased to such a degree that they attained

the size of the adult frog, although they still retained their tadpole appearance. It is interesting to note that the feeding of thyroid extract to tadpoles has the opposite effect. The tadpoles shed their tails, grow their hind legs; in other words, become full-fledged frogs, though their growth is retarded. For this reason it has been maintained that for a time in the period of development of the individual, thyroid activity is closely related to the thymus.

The thymus, besides being instrumental in the phenomenon of puberty, is also a potent factor in the building of the bones. Though life will continue upon the removal of the thymus in infancy, a rachitic child will result, for the skeleton is retarded in its normal growth.

Sciplades' Experiments with Dogs

In order to find out just what relation there exists between the thymus and bone growth Sciplades performed an experiment with young dogs. He removed their thymus glands completely and noted results. After a short period a disease typified by softening of the bones resulted. In human beings osteomalacia is the name given to this malady, the

cause of which is improper functioning of the thymus. The administration of thymus extract does not cure osteomalacia.

Another disease called "mors thymica" or "thymic death" is caused by the thymus. The organ enlarges, causes difficult breathing, and sometimes terminates in death. This disease is often found in infants.

The Blue Baby

Causes of thymic enlargement or hyperactivity of the thymus gland sometimes are found in the new-born child. If prenatally, the thymus is too greatly enlarged, great difficulty is experienced by the new-born infant in inhaling. The effort causes a blueness in the appearance of the child. These children when born are known as "blue babies." Sometimes the breathing may continue with difficulty for a few days, swaying from normal to breathlessness, until the attack may be so acute that death ensues. It is not only a new-born baby that is subject to thymic enlargement, but sometimes it may occur in late childhood in an apparently healthy child.

The Thymus and Growth

In the middle of the nineteenth century Friedleben, one of the first to study the function of the thymus, found that it controlled the nutrition of the body. He discovered that underfeeding for a period of time would reduce the size of the thymus. Prolonged diseases that weaken the physique also cause a diminuation in the size of the thymus gland, so that the facts point to the conclusion that there is a very close relation between growth, nutrition and the thymus. In France four hundred feeble-minded children were examined. They were malnourished and weak. Although they all had normal thyroids, three-fourths of them had no thymus at all.

The muscles, too, are under the dominion of the thymus. In cases where there is a degeneration of the gland substance or where tumors are formed in the thymus the muscles of the body weaken, while the muscle cells atrophy. There are often cases where a person is fatigued at the slightest exertion. The muscles ache and are cramped. The nerve endings are easily excited. Though many reasons may be found for this state of affairs the root of it may often lie in malfunctioning of the thymus.

Status Lymphaticus

A condition often connected with hypertrophy of the thymus gland, that is, with its enlargement, together with overgrowth of the whole lymphatic system, is Status Lymphaticus. Those persons who are afflicted with this disease are subject to the least harmful influences and may die from the most simple causes.

The cause of the disease is the supply of an abnormally large amount of secretion by the thymus gland. Sometimes it is claimed that the adrenal glands are intimately related with the thymus in the causation of this malady. Whatever the cause may be, it is certain that an enlarged thymus exists in status lymphaticus, for a number of cases have revealed that death is caused by the compression of the windpipe by the thymus, causing suffocation.

The individual with an enlarged thymus is usually taller than the average for his age. The bones are more fragile and the heart is small. The brain, on the contrary, is larger than ordinarily. Examination by the X-ray shows a shadow over the upper part of the heart and covering the blood vessels at

the base. This shadow is caused by the persistent thymus gland.

The Thymus Personality or Angel Type

The flaxen-haired angels represented in the medieval German paintings, the tall, wistful damozels of the pre-Raphaelite canvases belong to the thymus personality. Because of their delicate physique they may be called the angel-children.

In the male the thymo-centric personality is manifested in slenderness and gracefulness of body. The chest is long and the waist-line slender. The pelvis is feminine in form. The complexion is soft, the skin smooth to the touch and pleasing to the eye. There is an absence of the male hair on the face and body, and what little of it there is is soft of texture and inclined toward the blond. Because of the thymus' influence on the skeletal bones, there are often cases of double-jointedness and flat feet among the thymo-centric beings.

Psychically they are prone to suffer from complexes of inferiority. Aware of their physical weakness and delicate frame, they are weighed down by the thought that they are not equal to the endurance of the normal type. During puberty and adolescence

their trials are greater, for their resistance is weaker. Like other glandular personalities they are emotionally unstable and plunge from one emotion to another within a short period of time.

The Parathyroids or the Glands of Equilibrium

The Parathyroid glands are four in number, measuring about two to four millimeters in width and thickness and three to fifteen millimeters in length. They are imbedded in the tissue of the thyroid gland, two in the upper portion and two in the lower pole. They are located on the back part of the thyroid and sometimes when this gland is removed the parathyroids are apt to be taken off,—an accident to be avoided. Some observers have regarded them as accessories to the thyroids, without any definite function. Gley, the French physiologist, and Halstead, the Englishman, have demonstrated that the parathyroids have an important internal secretion of their own.

Tetany and the Parathyroid Glands

The removal of the parathyroid glands in a dog or a cat is followed by a definite group of symptoms

to which the name of tetany has been applied. There is a period of from twenty-four to seventy-two hours, during which the animal is quiet except for unusual thirst. Gradually twitching of the muscles of the head, face and tail occurs. The temperature rises and the muscular twitchings increase in frequency and severity. The paws become contracted and the spasm of the muscles spreads through the whole body. The heart beats faster, the respiration is shallow and frequent and the animal turns over on its side and dies in a convulsion. If the animal is sufficiently strong to successfully fight off the attack, there is a temporary relief, followed in one to forty-eight hours by other convulsions. The animals lose weight and die in from ten to fourteen days.

In man tetany has been produced when the parathyroids were accidentally removed in operating for goiter. There is an immediate increase in the cerebral excitability and a loss of muscular and nervous equilibrium. The least noise throws the individual into a spasm. There is an acute increase in the sensitiveness of the brain and spinal cord. The nutrition is interfered with, particularly that involving the bone. The teeth do not develop normally, the hair

falls out, the nails become brittle, the bones weaken, and general wasting sets in.

The Treatment of Parathyroid Deficiency

The implantation of parathyroid tissue has successfully relieved the tetany. However, after a few months the grafts degenerated and the symptoms of parathyroid insufficiency reappeared. The implantation of the thyroid gland has also been employed with a varying degree of success. The administration of the extracts of these glands by mouth or by injection has at times decreased the hyperexcitability and restored the equilibrium.

Various nutritional disturbances respond well to parathyroid therapy. Observers have reported improvement in varicose and intestinal ulcers, in chronic rheumatism and in arthritis or inflammatory enlargement of the joints. The parathyroids, in addition to regulating the nervous responses, seem to be useful in warding off disease, and they may be considered defensive mechanisms.

The Pineal Gland,—The Seat of the Soul

At the base of the brain the pea-sized gland that Descartes called the seat of the soul is situated, and

like the thymus its greatest importance is during the infancy and childhood of the human being. In the former, as in the sheep, it is round; in cattle, oval; in human beings it is three-sided in shape. Some zoologists maintain that the pineal gland is the remnant of a primitive eye. In some animals the evidence is such as to be convincing. There is a species of lizard called the Hatteria, on the head of which a scale is painted to resemble an eye. Baldwin Spencer showed that it is situated exactly over the pineal body and revealed the vestiges of a retina.

The Pineal Gland and Its Activity

There are many theories as to the activity of the pineal gland. Some investigators believe that it has an internal secretion which, like that of the thymus gland, inhibits the growth of the body and development of sex phenomena until the normal time for their manifestation. These investigators came to this conclusion because when the pineal gland is invaded by neoplasms or tumors, the oncoming of puberty is accelerated, while precocity in other physical events is also observed. Hyperpinealism, or overactivity of the internal secretion of the pineal

gland, also causes premature bursting of a human creature into sex life.

Another group of scientists showed that by feeding a substance found in the pineal gland to tadpoles the color cells were affected. Thus they came to the conclusion that the pineal gland also controls pigmentation.

Still other investigators maintain that the pineal is not an endocrine gland. Indeed, Gley, who has done exhaustive research work on the glands, does not include the pineal in his book. As in the case of the thymus and the parathyroids, it is not yet possible to arrive at any definite conclusion as to the classification and functional activity of this group of glands.

Foa's Experiment with Roosters

Extirpation of the pineal gland does not lead to fatal results, therefore it is not vitally necessary to the organism. Yet Nature seems to do everything advisedly. Every hair of her creatures is there for some reason; every dimple serves its purpose. A gland, no matter how small and insignificant it may appear, cannot be removed from a body without causing some change.

Foa, an Italian investigator, was curious to know what effect the extirpation of the pineal gland would have upon roosters. Accordingly, he performed the operation and awaited results. Soon the testicles of the birds enlarged.

Horrax of Chicago performed a similar operation upon guinea pigs and obtained the same results. The testicles of the guinea pigs were accelerated in their growth. Both experiments indicated that the relation between the pineal gland and the gonads is close.

In human beings abnormalities of the pineal gland give rise to interesting developments. Zandren quotes that in seventy recorded cases of pineal tumor in human beings, most of them occurred in adults, while only ten were found in boys below the age of puberty. All of the boys showed premature development of primary and secondary sex characteristics, as well as precocity of mind.

CHAPTER VIII

DIET AND THE GLANDS

THE importance of food upon the health and well-being of the body has become more and more a matter of interest to the public in general as well as to the medical profession. It is recognized that if more attention were given to one's daily diet, far greater enjoyment would be derived from life, and less, if any disease would occur. Proper nourishment of the body, with generous amounts of beneficial elements and less of the injurious, would do much toward preventing those maladies that are caused by improper nutrition. Its action would then be preventive, rather than curative. It is a well-known fact that if the body is well supplied with energy and tissue-building material, it is fortified against the invasion of inimical microbes carrying dangerous and pernicious diseases. Its resistance is increased, and in the battle that follows between the attacked organism and the attacking germs the

former will carry off the victory. Once this truth becomes ingrained in the public brain, greater attention will be paid to an item of daily life that is indeed the primary factor in maintaining it.

Food and Its Relation to the Glands

The importance of the endocrine glands as vital organs of the body has been demonstrated. Their perfect coordination and harmony result in good health. Once the slightest jolt occurs in the smoothness of their function, ill health is the result. As health depends upon the proper nourishing of the body, and as the glands are among the most important organs of the human organism, food is bound to affect them, either beneficially or detrimentally, according to the presence or absence of health-giving elements. It has been shown by some investigators that the glands have their favorite foods upon which they thrive, and their unpalatable ones which act harmfully upon them. The value of the various foods depends upon the presence of vitamines, hormones and enzymes, factors so essential in maintaining the life and well-being of the body and its organs that extensive research is still being carried on about them.

The Hormones, Vitamines and Enzymes and What They Do

Most of the glands,—the gonads, the thyroid, the pituitary and the adrenals,—possess a form of chemical energy known as the hormone. No definition has as yet been formulated. Some call the hormones a form of energy; others have been able to ascertain the composition of those found in the thyroid and in the adrenals by taking simple elements and building them up into the hormone. On the whole, however, the knowledge that science has been thus far able to obtain about them is meager. It is definitely known, though, that the hormones are vitally necessary to the glands, and that in cases of glandular deficiency the administration of an infinitely small amount of hormone is enough to bring the gland back again to normal.

Vitamines are elements found in foods and are absolutely essential to the maintenance of life. A very small amount of vitamine does very much for the organism, and, like the hormone, while it is instrumental in hastening the chemical action of the body, it does not itself undergo any appreciable change.

Vitamines vary in amount in the various kinds of foods. In some, they are found in large quantities. In others, they are present in such small amounts that they are negligible. Partaking of foods that do not contain vitamines is injurious to the body, causing disease, and as a result, death. In studying the malady known as *beriberi* it was found that absence of vitamines in food caused it. Those suffering from it had partaken exclusively of polished rice, that is, rice which had had the vitamine-containing husk removed. When unpolished rice was given them the patients recovered.

Enzymes are also factors in chemical action. Their chief function is fermentation. Buchner, an investigator, discovered that enzymes may be squeezed from yeast cells. Very often "ferment" and "enzymes" are used synonymously. Hormones have been compared to vitamines, but they are distinctly different, the former being able to withstand heating, whereas the latter are destroyed by such heat. The hormones, the vitamines and the enzymes are all similar in being activating substances. The hormones stimulate the endocrine glands, the vitamines, the nutrition, and the enzymes the digestion.

All of these three together influence the character of the internal secretions.

The Kinds of Vitamines

There are three kinds of vitamines in all, one kind prevailing in some foods, another in other foods, and the three sometimes occurring in considerable quantities in certain nutrients such as the tomato. Just what constitutes the vitamines?

Professor Hopkins of Cambridge took two sets of rats of the same age and weight and subjected them to the following feeding experiment: the first set he fed with extracted constituents similar to those found in milk—fats, proteins, sugar and mineral salts. The second set he fed with the same substances, adding a small quantity of fresh milk. The first set of rats lost in weight and showed symptoms of disease. The second set thrived and gained in weight. On the eighteenth day the diets were reversed, whereupon the first set began to gain, and the second to lose, in weight. The conclusion to be drawn is that there must be something in fresh milk other than fat, protein sugar and mineral salts which influences the nutrition and development of the individual. This something is the vitamine.

In order to understand just where the vitamines are found, it is necessary to go into detail about foodstuffs and their supply or lack of these nutritive principles. The vitamines may be classified into Vitamine A, the anti-rachitic, fat-soluble; Vitamine B, the anti-neuritic water-soluble; Vitamine C, anti-scorbutic water-soluble.

Vitamine A

Vitamine A, the anti-rachitic, bone-hardening vitamine, is found to a large extent in raw milk, animal fats, the yolks of eggs, and the growing parts of plants. It is also present in animal tissues, such as the liver, the heart and the kidneys; in fat fish like herring and salmon, and in animal brains, sweetbreads and roe.

The quantity of vitamine in raw milk is determined by the supply of green fodder contained in the cow's diet. McCarrison found that the milk given by cows in summer when they fed in the pastures was richer in vitamines than that furnished in winter. The same principle would apply to nursing mothers. The greater the quantity of fresh greens eaten during the period of lactation, the richer in vitamines the milk.

In fats and oils vitamine A is also present. Cream possesses less of it than butter. Crude cod-liver oil is very rich in it. Olive and other vegetable oils do not contain it, and if it is present, it is only in small quantities.

Fresh vegetables, such as spinach, lettuce and brussels sprouts, are very rich in it, and the fresher the vegetable the more vigorous the vitamine. In maize, linseed and millet it is also present, though in the resting tissues of plants, unlike vitamine B, it is absent.

Tomato is a very rich source of vitamine A. Indeed, it is a source of all other vitamines. Even in canning it does not lose much of its original value. Fruit juices in general should be had by both old and young, as they contain the three kinds of vitamines.

The properties of vitamine A are many and varied. Vitamine A is soluble in ether, alcohol and benzine, and is oxidized under the influence of light and air. Though it is destroyed at a temperature of one hundred degrees or higher, it resists heat more effectively when it is present in the vegetable. Vitamine A is stored in fats and it is more necessary

to young and growing animals than to full-grown ones.

Vitamine B

Vitamine B, the anti-neuritic, or nerve-disease curing vitamine, is present in natural foodstuffs, germs of seeds, eggs, yeast, wheat, rice, bran, peas, beans and lentils. Cellular organs like sweetbreads and the liver also possess it. Fish and meat contain but little of it, though vegetables and fruits are richly endowed.

In eggs and seeds vitamine B seems to be stored for the purpose of supplying food for the young. In cereals the embryo contains the greatest quantity.

The endocrine bodies, the thyroid, the thymus and the pituitary possess a great amount of vitamine B, but, strange to observe, when the glands are dried for the purpose of making commercial extracts, they lose much of their vitamine value.

Very often yeast and vitamine B are associated, for yeast is a valuable source of it and acts upon the body by stimulating the appetite.

Fruits, such as bananas, oranges, lemons, grapefruit, and many others of similar nature contain much vitamine. In fruits it is not destroyed by

drying. Vitamine B is associated with *beriberi,* a malady common in Asia and Africa and characterized by dropsy, anæmia and paralysis. If vitamine B is lacking in the items of one's daily food *beriberi* may develop. Vitamine B is soluble in water or alcohol but not in fats. Slow heating to 100 degrees destroys it and higher temperature accelerates its deterioration.

Vitamine C

Feeding guinea pigs with a mixture of soja bean flour, whole milk, dry yeast, paper pulp and mineral salts causes them to develop scurvy. Scurvy is a disease characterized by spongy gums, hemorrhages from beneath the skin and painful contractions of the muscles. Upon adding a little orange juice to the diet the scurvy rapidly disappears. The flour and milk are rich in protein, fats and sugar. The yeast contains the B vitamine and the milk the A. It is obvious that there was some other factor necessary to prevent the scurvy, and that this factor was contained in the orange. This agent found in orange juice is also present in many fruits and fresh vegetables. It has been named the water-soluble vitamine C or anti-scorbutic (anti-scurvy) vitamine.

In living tissues, the waste and repair processes of which are still continuing, vitamine C is to be found. It is low in quantity in raw milk, but lower still when the milk is pasteurized. When such milk is given to babies it must be supplemented by tomato or orange juice, to supply the vitamines that are destroyed through excessive feeding. Vegetables and fruits possess vitamine C in generous quantities, together with vitamines A and B. Tubers and roots have it least of all. Again, upon the freshness of the fruit or vegetable depends the vigor of the vitamine. The soil in which the fruits or vegetables are grown is also an important factor, as is also the ripeness. Perhaps this latter consideration is due to the effects of sun-rays upon growing things. The riper the product, the richer it is in vitamines.

When fresh foods containing vitamine C are heated, cooked or dried, the vitamine is lost, though in acid fruits, because of the action of the acid, the vitamine is preserved, even after heating. In most cases quick heating is less destructive than slow.

The Tomato, the Ideal Food

A tomato a day, not an apple keeps the doctor away. The apple is one of the poorest vitamine

carriers. It has traces of A, B and C, but compares poorly with the orange and especially with the tomato. The old slogan of an apple a day is a thing of the past, and though it may have served as a good advertising catch phrase, it has no scientific basis. Celery is another vegetable vaunted for its great nutritional value and tonic effects. As a matter of fact it is of very little worth and its popularity is due to its pleasing flavor. Celery has no A vitamine, no C vitamine and only traces of B.

From the viewpoint of vitamine content the apple is a useless expenditure. Furthermore as a food its nutritional value is very low. It contains one per cent of protein, five-tenths per cent of fat, and three and nine-tenths per cent of sugars, whereas milk contains two to three per cent of protein, three to four per cent of fat, and six to seven per cent of sugars. As a body fuel or heating agent it again fails, possessing one hundred calories per pound, whereas the orange has two hundred and thirty calories per pound. The apple just supplies the roughage and is useful in promoting intestinal movements, but the tomato furnishes the life-giving vitamines, the nourishing food compounds and the requisite calorific energy.

The tomato should be more frequently served as entree and it would not be amiss to finish the meal with it in the form of jam or preserve. The Italian method of employing tomato sauce for spaghetti, ragouts and meats in general could well stand imitation. Especially should tomatoes be eaten during the years of growth. It would not be an unwise procedure to forget the apple and adopt the tomato.

Malnutrition and the Glands

Perhaps one of the most disturbing factors influencing the normal functioning of the glands is the amount of vitamine furnished them by food. It has been found that if the body is not well-nourished most of the endocrine organs atrophy, while the adrenals undergo an unhealthy enlargement. In the thyroid gland the effect is most noticeable. After continued starvation the gland decreases so much in weight that it is no more than one-third its normal size. In the adrenals, on the contrary, the change in weight is two-fifths above the normal, and is caused by a hyper-secretion in the medullary section. The increase in weight varies with the animal. It has been found that a dog that has been subjected to a period of underfeeding of fifteen days or more

undergoes an increase of the adrenal glands equal to once their normal weight. In rats the gain in weight of the adrenals is even greater, even when the underfeeding lasts a much shorter period. Obviously there is a close relation between nutrition and the glands.

Lack of Vitamines and the Glands

The results of lack of vitamines in the human organism are the same as the effects of lack of food. All the glands are affected in the same way, most of them atrophying, while the adrenals enlarge. In the male organisms an increase of the pituitary bodies is also noticed. McCarrison in his extensive research on the effect of vitamine deficiency upon the glands found that the same results as produced by starvation were obtained, even when only vitamine B was lacking. In monkeys it is different, for while the adrenals enlarge whenever any one of the vitamines is omitted from their diet, the pituitary bodies increase in weight only when vitamine B is absent.

The adrenal glands do not undergo so great a change if the food deficient in vitamines is supplied with elements approximating them. In pigeons,

rats and monkeys the increase of the adrenal medulla is accompanied by a similar increase in the medullary secretion, while the cortex, on the other hand, is almost wholly devoid of lipoid or fatty secretion.

The thyroid gland in animals is very much affected by fat excesses and undergoes enlargement during a protracted fatty diet. When McCarrison fed some semi-wild pigeons on a generous diet of grains liberally buttered, the thyroid gland increased in almost sixty-five per cent of the cases. The adrenals dwindled in size to below normal. The result is the obverse of that remarked in underfeeding. The less nourishment is given the body, the greater the enlargement of the adrenals and the atrophy of the other glands; the more generous the food eaten, the smaller the adrenals and the greater the size of the other endocrines.

Goiter and Onions

When McCarrison added chopped onions to the diet of the pigeons which he had fed on grains and butter, he found that the enlargement of the thyroid gland was not so pronounced, nor was the diminution of the adrenals as noticeable as before. This result was due to the presence of the vitamines in

the onions, which tended toward lowering the thyroid enlargement. The fat of the butter was active in aggravating thyroid increase, and, as was remarked in the case of the pigeons that had partaken solely of butter and grains, it acted in sixty-five per cent of the cases toward bringing about goiter. The addition of onions counteracted the effects of thyroid enlargement, thus obviating its occurrence. It has therefore been shown that the onion is a valuable food because of its vitamine content. Particularly is it of use in the prevention of thyroid enlargement.

Vitamines, Cod-Liver Oil and Iodine

In experiments on young tadpoles it was found that the excess of fats in their food caused a delay in their development. While the normal change was retarded by all fats that were given, harder fats, such as butter, were not so effective as the fluid ones, such as cod-liver oil. The delay in the metamorphosis of the young tadpoles was associated with retarded growth of the thyroid gland. When one milligram of iodine was administered, it compensated for the delay in the thyroid development in those cases where the tadpoles subsisted only on but-

ter and fluid, oily acids. It was of no effect in the delay of thyroid growth caused by excessive feeding of cod-liver oil. It may be concluded, therefore, that a diet of fats, together with a proportionate amount of iodine, will preserve the normal balance of growth of the body, as well as of the thyroid gland. If too much iodine is taken, the metamorphosis of the tadpole into a frog is greatly accelerated, especially when butter is added to the diet. Iodine is very commonly used as a tonic for growing children, usually in conjunction with iron in the form of syrup.

The Effect of Lack of Vitamines A, B and C

Each class of vitamine is of specific value to the human body, and with the absence of any one of them for any length of time detrimental results may be observed. When vitamine A is lacking from the diet, growth is slow, if it occurs at all. The eyes become diseased. The enamel of the teeth is poorly calcified. Rickets may intervene. In Vienna children and young adults are very often afflicted with this disease, owing to an insufficient supply of vitamine A. In animals, its lack is manifested in sores, bushy fur and scabbiness. They are not

vivacious and go about with a sort of hang-dog demeanor. With the proper supply of the necessary vitamine the abnormal conditions may be improved.

Vitamine B feeds the cells of the body. Its absence starves them, especially the nuclei, or vital parts of the cells. The first symptoms of vitamine B starvation are loss of appetite and diarrhea. There is a difficulty of swallowing and breathing. The nervous system is impaired. The transportation of the food along the alimentary tract is not done efficiently. The digestive secretions also fail in their normal functioning. The whole organism is deprived of the protective means that ward off infection from without. In human beings, when the correct food is given the nervous system responds readily.

When vitamine C is lacking in the diet, growth ceases, though the joints of the bones and the rib-junctions enlarge. There is also present a marked fragility of the bones, which fracture easily at the slightest provocation such as a hurt or a fall. The teeth are loose and hemorrhages are frequent. In order to correct the disorders that ensue from the want of vitamine C in the daily food, various fruit juices should be added. Tomatoes, oranges and

lemons are rich in vitamine C. Fresh vegetables such as cabbages, lettuce, rutabaga and carrots contain it in generous quantities. Cooking and heating undermines the beneficial value of this class of vitamine, therefore, whenever possible, raw fruits or vegetables should be eaten.

Vegetarianism and Animal Foods

Meat is considered by many to form the best diet for the animal organism. It is a builder of muscle, and stimulates the increase of blood corpuscles and the growth of fibrin. Though a vegetable diet also strengthens and hardens the muscles, it does not do it as effectively as animal meats.

Meat contains fewer vitamines and less proteins than milk and eggs. It is poor in calcium, a mineral salt necessary for bone-formation, but it stimulates the appetite. In a dog that was fed on porridge for some time, the gastric juice was scanty and viscous. When meat was given to it, the juice was plentiful and fluid.

Carnivorous animals seem to find in meat all the vitality they need, and their vigor, activity and agility are not equaled by any of the herbivorous or plant-eating animals. In Mesopotamia the white

troops resisted disease better than the Hindoos, who subsisted only on a vegetable diet and refused to partake of carnivorous foods.

There is undoubtedly something in meat, some energy-giving element that has not yet been discovered. The fact remains that as a rule meat-eating races are much stronger than those whose food is solely herbivorous.

CHAPTER IX

GLANDULAR INTERACTION

From the foregoing chapters the reader may have gained the impression that each gland gives characteristic symptoms, and that upon examining the individual the guilty endocrine organ can be detected. This is not so simple, for although each gland produces its own disturbances, the effects are so far-reaching as to involve the whole endocrine system. The human organism is a whole consisting of interrelated parts. The affection of one throws the entire body out of gear. There is really no such thing as a disease pertaining to one gland exclusively. The disease of one gland means the involvement of many or all the glands forming the endocrine chain.

The Glands in Harmony

When the body is in a state of health, the glands are in harmony. The secretions are neither too

great, nor too little. There is no perversion in any of their functions. That health does not depend upon the physical alone is well demonstrated by the diseases of the internal secretions. We have already shown that grief, pain, sorrow, anger, hunger, fear, unrequited love and unfulfilled sexual craving affect the glands and their secretions. As far as the mind is concerned, the effect is crystallized in the form of psychological or mental aberrations, complexes and phobias, and often when psychoanalysis fails in touching the root, glandular treatment is of great value. This is so because physical health depends upon the normal activity of the glands. If the functioning of the glands is dependent upon mental stimuli, as has already been seen, the influence of the mind upon disease is self-evident.

We are living in a psychological age, and the progress made in science as well as in art has been along the lines of the psyche. Let us take literature as an instance. At first it was exclusively devoted to mythology and legendary heroes endowed with immortal traits. Then came the days of chivalry and knight-errantry. Eventually, the lower and middle-classes found their place. All ranks and stations of society were represented, but represented

as puppets controlled by the strings of plot and story. They were types, embodiments of theories, but seldom individuals. To-day the narrative has given way to introspection and we have the psychological novel, which is only an expression of the universal recognition of the importance of the mind. In science we have had a similar evolution. The scalpel of the anatomist is being supplemented by the psychoanalytic methods of the Freudians and by the intelligence tests of the psychiatrists.

The Glands in Discord

A stimulus affecting the function of an endocrine gland does so in one of two ways, either by increasing or decreasing the amount of internal secretion. True as this may be in a great many cases, it is not always so, for at times the secretion is neither increased or decreased, but the character of it is changed, perverted or vitiated. Furthermore, the affection of one gland influences the others so that the whole endocrine system suffers and we have a pluriglandular disturbance. It is commonly found that when the thyroid gland is enlarged, there is a corresponding diminution in the size of the adrenals,

and vice versa. Certain glands are antagonistic to others that may be situated near them. For instance, the thyroid and the parathyroid often seem to be inimical, while the pineal and the pituitary glands are seldom in accord. Not only does one gland act contrary to another, but it may carry on an internecine war between its various parts. The medulla and the cortex of the adrenals sometimes become antagonized and work against each other. In the gonads a similar internal warfare is at times carried on between the sperm or reproductive cells and the somatic or tissue-building cells. In some cases the antagonism is necessary to maintain the equilibrium of the organism, but most often it upsets the balance and creates the pathological conditions, the study of which has given rise to the comparatively new science of Endocrinology.

Affinities and Antipathies, or Attraction and Repulsion

We have observed that certain glands act antagonistically toward each other; that is, they have a certain antipathy of function that is not always injurious to the normal equilibrium of the body.

There are glands, on the other hand, which cooperate with neighboring glands that act as their affinities. Should one of them fall into a state of abnormal or diseased activity, its affinity temporarily assumes the responsibility of performing the work for which the former has been incapacitated. Such an affinity exists between the pituitary, the thyroid and the adrenals. A decreased efficiency of the thyroid gland causes symptoms that have been described under cretinism and myxedema. The individual becomes apathetic, slow and lethargic. He seems possessed by an overwhelming torpor. His face, abdomen and limbs swell. His growth stops and we may have an undergrown, underdeveloped, puny being. The thyroid gland being diseased, the pituitary takes up the work, attempting to overcome the symptoms produced by the lack of thyroid secretion. The torpor decreases, the swelling tends to disappear, and there is an acceleration which may go to the other extreme of gigantism. When the pituitary gland, which influences the contraction of the uterus, bladder and intestines, and affects the tone of the brain and sex cells, stops functioning, the adrenals undertake the task.

The Adrenals and the Thyroid

The adrenal glands influence practically all the endocrines. This is due to the effect of adrenalin, which, coursing through the blood stream, stimulates the circulatory and muscular as well as the nutritional state of the human organism. The adrenals are most easily affected by external stimuli, as shown by the fear experiments of Cannon on cats. An overstimulation of the adrenals means a decrease in the rate of circulation, the tone of the muscles and the state of nutrition, with the consequent development of the well-known condition of general debility. This deficiency affects all the other glands, and we have a lessened activity of the whole endocrine system.

The thyroid and the adrenals have a very close relation. Often, in a diseased condition of the body caused by either too great or too little a secretion of the adrenals, an improvement may be noticed when the thyroid is acted upon, whether surgically or by means of glandular treatment. Removal of the thyroid impairs the normal functioning of the adrenals. The reintroduction of the thyroid secretion by transplants or injection of the extracts re-

establishes the normal activity of the adrenals. Hyperthyroidism increases the amount of adrenalin in the blood and hypothyroidism has the opposite effect. It is therefore to be concluded that the thyroid and the adrenals work in sympathy, stimulating each other's activity.

The Pituitary and the Thyroid

The pituitary and the thyroid glands act in accordance with each other. This is particularly true in their effect upon the gonads or sex glands. The extirpation of the pituitary gland is followed by increase in weight, and decrease in size of the sex glands. The mental development is arrested. The same results are observed when the thyroid gland is excised. Rats whose thyroids had been removed, upon being fed with pituitary extract showed a rapid gain in weight. Cretins undoubtedly improve under thyroid medication, but sometimes there is a halt in their progress. If the pituitary gland is then administered in addition to the thyroid extract the improvement continues unimpeded. These favorable results can be explained by the fact that there is a sympathetic relation between these two glands, so

that the disease of one may cause a similar condition in the other.

The Pituitary and the Gonads

The influence of the pituitary on the sex glands has already been described, but this influence is particularly exemplified by the pituitary headache. This headache is frequently wont to occur prior to the oncoming of menstruation and is relieved by the taking of the pituitary extract by mouth or injection. During the period of menstruation there is a distinct action of the ovaries which causes the pituitary to overact and increase in size. This enlargement causes pressure symptoms and the consequent headache. In addition there probably is a change in the quality of the secretion which is corrected by the ingestion of the pituitary extract.

Scanty secretion of the pituitary gland causes a partial absence of the secondary sex characteristics. In the man the voice may remain high pitched, the face smooth and hairless. In the woman the breasts may not develop and there may be no pubic hair. Conversely, removal of the ovaries or testicles causes an enlargement of the pituitary gland and the de-

velopment of the secondary sex characteristics of the opposite sex.

The Thyroid and the Gonads

The removal of the ovaries causes an enlargement of the thyroid gland. Perhaps this is the reason that goiter is often developed at puberty, at the menstrual period, during pregnancy and at the menopause, climacterium or change of life. Gley and Champy have noted that the removal of the thyroid in the rabbit is followed by an increase in the size of the ovaries. On the other hand, Von Eiselsberg demonstrated that the removal of the thyroid causes a decrease in the size of the sexual glands. The results of these experiments are diametrically opposed, but nevertheless they prove that the removal of the thyroid does affect the generative organs in some manner, the exact nature of which has not as yet been conclusively determined.

The Thymus and the Thyroid

The thymus has been described as the gland of youth. The thyroid is the gland of energy, progress and growth. A persistent thymus tends to increase the period of infancy and delay the awakening of

maturity and sex life. The thyroid, on the other hand, is its natural antagonist and accelerates growth and tends to precipitate an early puberty. The thymus is still a mystery, and to the future belongs the exact determination of its raison d'être.

Dysfunction or Perverted Activity of the Glands

For the most part we have spoken of the secretions in the terms of quantity. However there are disturbances which are very common and affect the quality of the secretions only. In these instances the secretion is neither increased nor decreased but the character of it is changed or perverted. The gland remains the same in size, but there are changes in its interior, its structure, chemistry and physiology. To this form of disturbance the Greek prefix of *dys,* meaning bad, has been applied. There are various kinds of dys affections; indeed, any one of the endocrine glands may be dys affected. The most important of these affections are dysthyroidism, dyspituitarism and dysovarianism.

Harvey Cushing of Boston was the first to use the term dyspituitarism. This condition, which we have already described in detail, is characterized by the

presence of both hyper and hypo symptoms in the same individual at the same time.

Henry J., twenty-eight years of age, was built on a gigantic scale. He was six feet and one inch tall, powerful, and of large bony structure, particularly about the hands and feet. His skin was smooth, delicate and practically hairless. He had made several unsuccessful attempts to raise a mustache. Otherwise he was a normal male. He came under our observation eight months after an attack of encephalitis lethargica or sleeping sickness. His complaint was inability to engage in the sexual act. Upon questioning we ascertained that there had been a great increase in weight, the adipose tissue being deposited about the abdomen, chest and thighs, a distribution similar to that found in women. The pulse was low, the temperature subnormal and he was very sensitive to cold. He was still lethargic and would fall asleep on the slightest provocation. The external genitalia were normal in size but erection did not occur.

An analysis of this case shows that originally the man was inclined toward the hyperpituitary type, as demonstrated by his large hands and feet and the powerful skeletal structure. The encephalitis

produced a series of symptoms typical of hypopituitarism. Examination revealed that at the present time the patient had symptoms of a decreased secretion superseding an old hypersecretion. The patient illustrated the usual symptoms of dyspituitarism.

Dysthyroidism or Perverted Activity of the Thyroid

Dysthyroidism is quite common, but passes by unnoticed as it frequently manifests itself at puberty. A girl may be below the average height, have a sallow complexion, scanty eyebrows, irregular and carious teeth and cold extremities. She may show both physical and mental retardation. Of her it may be said that she is ever "early to bed and late to rise." She is neglectful of her clothes and unmindful of personal appearance, going through her daily tasks half asleep and half awake. With the approach of puberty and the oncoming of adolesence, this insipid bit of drabness changes and blossoms forth into colorful womanhood. She becomes restless, active, no longer one of the herd but on the contrary is the dominant spirit in home and public life. Physically, however, she may still retain the

corpulency of the hypothyroid type. Mentally she is the typical hyperthroid personality.

Dysovarianism or Perverted Activity of the Ovaries

Dysovarianism displays functional, physical and psychic disorders. Among the functional symptoms are hot flushes of the face, spells of perspiration, head pains, dizziness and various aches all over the body. The most common physical disorders are increased blood pressure, dryness of the skin and goose-flesh. Psychically these patients show neurasthenia, nervousness and a morbid degree of emotion. Worry and anxiety are common. They are unstable and depressed, and suspicious of every one about them. Sexually they may express their eroticism in various indiscretions, or sublimate their desires into religious mysticism.

Glandular Interrelation and Psychoanalysis

As the glands are interrelated and their perfect coordination leads to the health of the body, so the health of the body has as a correlative the health of the mind. *Mens sana in corpore sano.* . . . A healthy mind in a healthy body. . . . This truth is

not of recent discovery, but existed long before psychoanalysis and endocrinology were ever thought of. If the human organism is in a state of well being, it means that every organ, to the most minute, is doing its work normally and well. The heart is pumping the blood so many times per minute, the lungs are inspiring the air, the endocrines are responsive to every stimulus from without; in fine, the body machine is running smoothly to the most apparently insignificant organ. What is the result? The individual goes about his duties seeing life through the proverbial rosy colored glasses. Nothing is too difficult for him to undertake, nothing too far removed for him to attain. He is active and aggressive. His mind works quickly and efficiently. Fatigue is out of the question. In short, everything, due to the healthful state of the mind, is interpreted optimistically.

The man whose physical organism is deranged forms quite a different picture. Let us say that his adrenals are suffering from decreased activity. No sooner is that the case than everything about him becomes somber and gloomy. Each ant-hill becomes a labor of Hercules. Every one about him turns into a conspirator to make life wretched for

him. In every new acquaintance he sees an added enemy, a stronger superior being whose main purpose seems to be to remind him of his own inferiority. Existence becomes impossible. Not infrequently suicide is the ultimate conclusion.

Edward B., twenty-four years of age, tall, well-built and fine-complexioned, came to us at the outbreak of the war suffering from acute melancholy and suicidal tendencies. He complained of pain in the muscles and inability to perform any physical labor. He had been drafted, and whenever he complained of his excessive fatigue he was not believed. His fellow-soldiers laughed at him and called him a slacker and a malingerer. Physical examination showed thymic involvement, which accounted for his fine, healthy complexion and smooth skin. His blood pressure was low, the pulse beat below normal. Upon being examined for adrenal insufficiency the typical white line of Sargent appeared upon the abdomen. There were also signs of hyperpituitarism, manifested by his great height and overdevelopment.

His melancholy and suicidal thoughts were found to be due to the feeling of inferiority. He was treated psychoanalytically and readily responded.

The various glandular disturbances that had caused the psychoses were regulated by the administration of glandular extracts. In a comparatively short time Edward B. was cured of his mental condition, and when he was eventually sent to France he distinguished himself by the ardor of his work and the stoical resistance to the hardships he encountered.

CHAPTER X

TEMPERAMENT AND THE GLANDS

POPE says, "The proper study of mankind is man," and to study mankind has always been man's ambition. To know man as a species is a comparatively simple matter, but to know him as an individual is a master task. The outstanding characteristics which distinguish one individual from another are character and temperament. Touching as these subjects do the very fundamental differences between human beings, they have been investigated by the scholars of all ages, from antiquity to modern times. Character and temperament affect the very essence of existence, and are probably the most important factors in what spells success. To achieve success has ever been man's endeavor. Little wonder, then, at the universal interest evinced in the study of these attributes.

The sum total of all the work and study of the thinkers on man is briefly summarized in the con-

clusion that character is what one is. It is a stamp impressed by environment and heredity. Education is included under environment. Some exclude heredity, but surely it cannot be denied, for to a very great extent we are what we are because of what our ancestors have been. To accentuate this factor, there need only be mentioned the relatively new science of eugenics, which devotes itself to the improvement of the human or animal stock through the selection of the fittest parents.

The Old Conception of Temperament

Temperament is authoritatively defined as the physical and mental character of an individual. This definition is very vague, ambiguous and practically meaningless. It is a galaxy of words with no significance. Temper, which is the base or root of the word temperament, is given a much more elucidating meaning as the state which results from the mixing of various ingredients. This definition gives a clearer conception and describes the cause. As commonly accepted, temper is a temporary, transient expression of the more permanent, constant temperament. Therefore, temperament may be defined as

the permanent or temporary physical and mental state of an individual, which results from the combination or mixture of various ingredients within the body.

The ancients realized that temperament was not simply a mental manifestation, but was constituted of the mental and physical expressions of internal organic components. Erroneously, they divided the body into four fluids or humors; blood, yellow bile or choler, phlegm and black bile. The variations in the relations and proportions of these fluids caused the various temperaments, and so they had the biliary or choleric temperament, the sanguine temperament, the phlegmatic temperament, and the melancholy temperament. In this fantastic empiricism, they have handed down to us the nucleus of our present knowledge of the internal secretions and their effects upon the temperament and character.

Our Conception of Temperament

Though there is no phlegm to produce the phlegmatic disposition, endocrinology teaches us that the disturbance of the internal secretion of the thyroid gland, known as hypothyroidism, will produce simi-

lar symptoms. Though there is no black bile to give melancholy, there are hypoovarianism and hypopituitarism with their mental pictures. Though there is no yellow bile to give rise to the choleric temperament, and though the blood does not make one sanguinous, hyperthyroidism can well do both and more.

Therefore, in the light of the recently acquired knowledge in the field of endocrinology, we propose a new definition for temperament. *Temperament is the temporary or permanent physical and mental state of an individual which results from the activity of his internal secretions.*

The Types of Temperament

The type of temperament depends on the type of internal secretion. We have shown that there are three principal varieties of secretions: hyper or increased, hypo or decreased and dys, or perverted secretions. Accordingly, we may divide temperament into three distinct forms, which may be termed the hypertemperament, the hypotemperament and the dystemperament. Irrespective of which gland is involved, if it is stimulated to hypersecretion the symptoms are all productive of an increased activity

of the physiological functions. If the secretion reaches too excessive a point the normal becomes abnormal, the physiological becomes pathological, and we then have the recognized endocrine hypersecretory disturbances, as hyperpituitarism, acromegaly and Basedow's disease.

If the organ is insufficiently stimulated, hyposecretion results and the symptoms are those of a decreased activity of the physiological functions. If the secretion is very markedly diminished the normal again becomes the abnormal and we then have the recognized endocrine hyposecretory disturbances, as infantilism, cretinism and myxedema. Very often it is not purely a hyposecretion or a hypersecretion, but a perverted secretion. The functions of the body become accelerated or retarded, dependent upon the character of the perverted secretion. The symptoms may at one time be those of a hyper type and at another time those of a hypo type, the condition varying from month to month, week to week, day to day and even hour to hour. The temperament varies accordingly. When the perversion of the secretion is persistent or very marked, we have the production of disease entities such as dyspituitarism, dysthyroidism and dysovarianism.

The Hypertemperament

The hypertemperamental individual is the hope and worry of humanity. He is the Light of the World and the Prince of Darkness. He is the leader or the misfit. He is the brilliant success or the glorious failure. He is the straight-jacketed, one-track-minded conservative, or the wild-eyed, long-haired radical. He is the typical man of action, fearless in the struggle of life, the hero of mankind, and, strange to say, the coward at home. Powerful as he may be, this is the type of man most easily fooled by women, henpecked by wives, deceived by sweethearts, domineered by mothers-in-law and taken advantage of by children. Men of genius, men of power and men of talent belong to this category. Samson the Strong, betrayed by Delilah, and Antony, the lover of Cleopatra, were hypertemperamental. History shows that it is not unusual for men of brain and brawn to become the so-called weaklings in the power of women. The ability to withstand physcial and mental hardships and the ready yielding to sex seem irreconcilable, but it is only a paradox. Hypertemperamental men are full of energy. They are the mental and sexual marathon runners, and even at an

old age they preserve their virility. The ordinary marital bonds, though fully fulfilled, are not sufficient, and it may be safely said these men have more than one love, more than one mistress and more than one home. To understand this paradoxical behavior, it is necessary to describe the effects upon temperament of the hyperactivity of the various glands. All the endocrine glands exert influences, but the most important ones from the standpoint of character are the pituitary, the thyroid, and the adrenals.

The Pituitary and the Hypertemperament

Hypersecretion of the pituitary gland activates the mental and physical processes. These are the precocious children, the infant prodigies and the star-pupils. The intellectuals, the thinkers, the philosophers, the creators, in short, the men of brain, are of the pituitary type. Genius is found associated with pituitarism, but it is a theoretical genius. These men possess self-control and will power, especially in sex matters, but are the submissive slaves of their mothers, wives or mistresses. Shakespeare, the super-giant among the giants of literary creative ability, was the henpecked husband

of Anne Hathaway, while Nietzsche was dominated by his sister. At times mingled with these traits, especially in women, there develop certain dare-devil desires resulting in pleasure-seeking, drinking, card-playing, smoking and swearing. These are the adventurous, thrill-seeking women.

The Adrenal Glands and the Hypertemperament

Hypersecretion of the adrenal glands gives symptoms which on cursory examination appear similar to those produced by an overacting pituitary gland. However, on close analysis, it is discovered that the symptoms differ, those due to the pituitary being more of a mental and theoretical nature, and those due to the adrenals being of a practical physical nature. Increase in the secretion of the adrenal glands produces vigor, energy, progressiveness, pugnaciousness and rapid action. The bosses of men and the drivers of slaves belong to the adrenal group. Geniuses are not uncommon, but they are of a practical nature in contradistinction to the theoretical genius of the pituitary. The adrenals produce the fighting men, the men who know "aut vinci aut mori."

The Thyroid Gland and the Hypertemperament

Hyperthyroidism produces its own train of symptoms. The hyperthyroid individuals are the "live wires"; they are full of vim, vigor and vitality but these qualities are of an unstable nature. They bubble over with enthusiasm, present a magnetic personality and are the center of attraction. They are very impulsive, free with their plaudits and just as free with their censure. They make friends easily, and lose them just as easily. As children they are subject to tantrums, and as adults they develop hysterics and psychic storms. Sexually they exhibit an eroticism which is difficult for them to control. Restlessness and sleeplessness are common. The insomnia is mingled with numerous dreams due to unsatisfied sexualism.

The hypertemperamental personality is composed of a mixture of the symptoms of all the glands described. There is no such thing as a clear-cut individual gland personality. As a rule, in a person belonging to this hypertemperamental type, there are evidences of the involvement of all the endocrine glands, and we may therefore have an adrenal-pituitary genius like Leonardo da Vinci, at once

genius of theory and practice. Or we may have the pituitary-thyroid woman, a mixture of brain and emotion, not uncommonly found among the great actresses, like Sarah Bernhardt, and the pituitary-thyroid-adrenal individual, endowed with a brain to think, emotions to feel and the power to do.

The Hypotemperament

The hypotemperamental individual is the backbone of the country and the bulwark of society. He does not believe in hitching his wagon to a star, but has his feet solidly planted on the ground. He is the easy-going, steady, safe and sure citizen. He is the dutiful son, the provider of the family, the good father and the loving husband. He does not build castles or wander to strange shores. To him belongs the making of homes. Sound judgment, shrewd analysis, clear vision, unruffled poise and a refreshing equanimity mark him a man of reliability. Such individuals do not soar to Elysian heights, nor do they descend to Stygian shores; theirs is the middle road of virtue, conventionality and safety. They are born to follow, and reversing Cæsar's maxim they would rather be "second in Rome than first in

an Iberian village," not because Rome is great but because it is not within them to be first.

Among this group belong the plodders, the men of detail, the statisticians, in short, all those whose work requires painstaking effort and great patience. The hypertemperamental individual may be brilliant in flashes, but to the hypotemperamental character belongs the distinction of being able to carry a difficult task to completion. Life is not made up of Hadley's comets or of shooting stars, wonderful as they may be. The progress of civilization depends to a great extent upon continued and persistent effort. The English are noted for their bull-dog tenacity and the Germans for their heed of the minutest details; and both of these nations, hypotemperamental in type, have contributed a great deal toward the welfare of humanity.

The Pituitary Gland and Hypotemperament

Even as the endocrine glands give symptoms which produce the hypertemperament, so also are they responsible for the hypotemperament. A decrease in the amount of the secretion of the pituitary gland retards the mental and physical processes. Depending upon the amount of the insufficiency of

the secretion, the individual may be phlegmatic, apathetic, slow, dull, backward, and even mentally deficient. If the decrease of the internal secretion is very marked, the person may become a moral delinquent, a pathological liar, a hobo or a prostitute. Of course, the latter are abnormal cases and really disease entities.

The Thyroid Gland and the Hypotemperament

Insufficiency of the thyroid gland gives symptoms which are not unlike those produced by the pituitary. The hypothyroid personalities are steady, sure and calm. They are not readily frightened, nor are they emotional. As a rule they sleep well and are not bothered by dreams. If the hyposecretion becomes very marked there may be mental retardation. It is interesting to note that these individuals, in spite of their balanced emotions, are very susceptible to disease, particularly to colds and tonsillitis.

The Adrenals and the Hypotemperament

Adrenal insufficiency produces a fairly well balanced individual. There is no tendency to fight, and there is a respect for law and order. If the insufficiency becomes abnormal, the healthy, peaceful atti-

tude becomes one of submission. If the condition progresses, the individual develops into a neurasthenic, tires easily, likes to sleep in the afternoon, is always seeking vacations, and lacks initiative. He is subject to various moods and is apt to be easily upset to such an extent as to require rest in bed. This type is considered nervous and inadequate. In school he is backward; in business, lazy; among friends, weak. Sometimes in a moment of indecision and excitement he will stake all on a gamble and lose.

A peculiarity of the adrenal hypotemperament is a desire for education. This class of individual is never satisfied with the standard form of education (probably because he is unable to grasp it), and seeks various new-fangled cults. It is amusing to note their desire to know "big words," without knowing simple ones. In arithmetic they want to know all about fractions when they are even unable to add or subtract. They become atheists, but pray to God in secret. They are radical among radicals, and conservative among conservatives. They are very easily led and are the personification of indecision.

Fortunately for humanity the hypotemperament

does not reach the low degree which we have described except in diseased conditions. The adrenal, or the marked hypothyroid types are comparatively infrequent to so marked an extent as to cause the deleterious effects we have discussed.

Even as the stimulation of an individual gland does not cause a clear-cut hypertemperamental personality, so, too, a deficiency in the amount of the internal secretion of one gland does not affect the character without affecting the secretion of the other glands. We may have a hypotemperament caused by the combination of the thyroid and the adrenals; or the pituitary, in conjunction with the other glands, may produce such a hypotemperamental personality as typified by the low-browed sons of toil.

The Dystemperament

There are individuals who fit in neither of the two classes described, and others that show the characteristics of both groups. They are the exceptions to the rule and very often, as is true of many exceptions, they are more usual than the rule itself. Such people may at times be hypertemperamental and at other times hypotemperamental. The hypothyroid girl who in puberty develops an increased secretion

of the thyroid gland acquires the hypertemperament, and may alternately display the traits formed by an increased or a decreased secretion. An historical example of this type of temperament is that of Napoleon.

Napoleon was the plaything of his glands. His physical as well as his mental traits reveal that at all periods during his life he was the victim of his internal secretions. Undoubtedly, he was primarily a pituitary type, showing the mental symptoms of a hypersecretion and the physical ones of a hyposecretion. He was the supreme egotist, the daring adventurer, the ruthless destroyer, the brilliant leader, the shrewd plotter, the clever intriguer, the unscrupulous climber, the most hated and the most admired man of his age. This tornado of force was encased in a puny body of five feet six inches, a hypopituitary body. Reenforcing the pituitary was an increased activity of the thyroid, manifested by brainstorms, emotional outbursts, and an uncontrollable eroticism. To Napoleon all women were created for the sexual gratification of man. He was intensely sensual and undiscriminating in his choice. A woman was a woman. The overactivity of his adrenals was shown physically by his dark skin, low

pulse and low temperature, and mentally by his pugnacity and military genius. In other words, in early life Napoleon possessed a hypertemperament.

To this hypertemperament, some of the symptoms of which lasted until his death, were gradually added the signs of a hypotemperament. With the advance of years Napoleon grew fat. The elasticity of his step disappeared; he moved slowly and deliberately. At about this time his judgment began to fail and he invaded Russia to his great misfortune. It was the beginning of the end. He began to complain of bladder symptoms, and we know that the pituitary stimulates the muscles of the bladder to contraction. Napoleon had always suffered from irritability of the bladder, but as he grew older it became worse, until at the battle of Waterloo he could hardly sit astride his horse. The animalism of his youth gave way to impotence, and he became lazy, easily tired, phlegmatic and inclined to drowse away,—signs of a combined decrease in the secretions of the pituitary, the thyroid and the adrenals. At times there would be spurts of thyroid energy, and he would ride his horse for hours at a time or plot to escape.

Dr. Henry, who performed the autopsy on Napoleon, gives the following account which sup-

ports our belief that the First of the Bonapartes was possessed of a dystemperament. "The whole surface of the body was deeply covered with fat. . . . There was scarcely any hair on the body, and that of the head was thin, fine and silky. The whole genital system (very small) seemed to exhibit a physical cause for the absence of sexual desire, and the chastity which had been stated to have characterized the deceased during his stay at St. Helena. The skin was noticed to be very white and delicate, as were the hands and arms. Indeed, the whole body was slender and effeminate. The pubes much resembled the Mons Veneris in women. The muscles of the chest were small, the shoulders were narrow, and the hips wide." This well demonstrates that not only was Napoleon dystemperamental in emotion, but that physically he had reached the abnormal extremes of the perverted secretions.

CHAPTER XI

PSYCHOANALYSIS, COUÉISM AND THE GLANDS

MAN has always evinced an insatiable curiosity in the mind and its work, but certain knowledge regarding this unseen tenant of our brain is of comparatively recent date. That the ancients knew of the mind and its powers is easily ascertained by studying the works of the early Greek philosophers. Heraclitus, the pessimist of antiquity, endowed man with two means of attaining knowledge in this ever-changing world, the senses and the reason or mind. The senses, however, give us a knowledge only of that which is transient and immediate,—the mind, on the other hand, the measure of things both finite and infinite, reveals to us our intimate selves and interprets for us everything, both human and divine. Indeed, as he later expressed himself with mystical reverence, the human mind is part of godhood, only in a less perfect, less ultimate form. Compared to the all-embracing divine mind, the human mind is as

imperfect as the ape with respect to man. Until about a century ago, certitude regarding the mind and its activity had not progressed far beyond Heraclitus. Everything had been speculative, and what psychological truths were discovered were part and parcel of philosophy proper. It was only in the nineteenth century that the study of the mind, or psychology, broke loose from the mother-stem of philosophy and took root as a recognized science.

Modern Psychology

Before attaining its present status, psychology underwent an evolution that is still in progress. There are many angles from which the study of the mind is treated. Some psychologists take into account only stimulus and response in the animal organism, and conduct all research along those lines. They study behavior and thence derive their name of Behavioristic Psychologists. Others, fully exemplified by Freud, Jung and their school, lay special stress upon the subconscious behavior of the individual, and thus the resulting science is the psychology of the unconscious. Since it is this latter attitude in the study of mind that is most closely related to psychoanalysis and auto-suggestion, we shall endeavor to elucidate

the reader on certain points that may have puzzled him.

The Conscious and the Subconscious Mind

The organism, whether waking or sleeping, is dominated by the mind. Early psychologists were aware of this, but while attributing the dominion of the body to the conscious mind they could not quite understand, how, in a state of sleep, when the individual simulates death, the functions of the body such as breathing and the beating of the heart are carried on as in the waking state. One is not conscious of what happens during sleep, and yet one is alive. One goes through a series of mental adventures. Battles are fought, oceans are crossed, friends long dead hold communion with the speaker and appear in living flesh and blood. Frustrated hopes are often brilliantly accomplished in a state of sleep. A rejected suitor has the palpable feeling of his lady's arms about his neck; he feels her warm lips against his; he hears her heart throbbing rapidly against his own. . . . He wakes up at the intensity of his feelings. . . . It was a dream. That is not only the case with adults. What young boy has not dreamed that the coveted jack-knife that had been

forbidden him in his waking state was given to him by some indulgent uncle? Not only one jack-knife, but hundreds and hundreds of them, barrels full of them, inviting his eager hands to play with them. . . . Again, the dreamer awakes . . . to the realization that the glorious wealth was only the product of his mind.

Was it his conscious mind that played such tricks with his senses? No, for if that had been the case he would have realized immediately that it was a dream. There are times when an individual has what is known as a double-barreled dream. Even while going through wonderful adventures he has a sense that they are occurring only in imagination. What causes that phenomenon?

Comparatively recent developments in the psychological world have shown that there exist in the human being two distinct selves—the conscious and the unconscious. The conscious self controls the human being in his waking state, helps him to interpret the things about him, aids him in forming opinions and guides him in his actions. It stores for him in the memory those facts that are essential for his individual life. It is also an essential factor in endowing man with moral and ethical concepts.

The subconscious self is not only active in the waking or conscious state, but also controls the human being during his sleep. It is an Argus-eyed vigilant, ever watchful, ever wakeful, and alert, observing everything, storing everything. It has an infallible memory. There is no event so insignificant of which it does not make a mental note; no adventure, however small, that it does not remember to the most trivial detail. It is an indestructible photographic plate, upon which all the deeds and thoughts of a human being are indelibly recorded.

Besides keeping close watch upon all the thoughts, actions and observations of an individual, the subconscious mind has other no less important functions to take care of. When the conscious mind is asleep, what is it that supervises the vital functions of the body? What force sees to it that the blood circulates, that digestion is carried on normally, that the pulse beats regularly? The subconscious. Is one ever aware that the heart is beating, unless particular attention is called to that fact? No, for the conscious mind has other things to attend to. But the subconscious mind never forgets. It is the supervisor of the human factory, and all the responsibility of the health of the organism is vested in it.

Psychoanalysis

In the latter part of the nineteenth century, Freud coined one of the most-talked-of words of this century,—psychoanalysis, or the analytical study of the mind. He recognized the fact that the human being is governed by both his conscious and unconscious self, and constructed a system of psychology the basis of which is the subconscious or unconscious mind. Upon the importance of the subconscious in both physical and mental health Freud built a curative system that yields more and more fruit with every passing year.

An electrical current is continually produced by the brain, and when it flows freely and spends itself through the various organs the human being enjoys that agreeable state known as health. However, when the same method of expenditure is used for a long period of time, fatigue, which is only another name for monotony, ensues. Rest, therefore, or change of exercise is essential, and is most easily obtained through sleep, nature's way of relieving weariness. All this is the normal process of gratifying normal wants.

Whenever a bodily sense has a desire to expend its

allotted quota of electric current there is a craving. A gratification of this craving leads to the welfare of the organism. If, on the other hand, fear or some other repression prevents the electric current from flowing freely, tension follows. The tension in clouds loaded with electricity ends in storms. In the human body it results in outbursts of neurosis.

Psychoanalysis and the Glands

The man whose power cannot flow freely feels hampered and weak. He becomes unsocial, self-centered and egotistical. He feels that the whole universe is against him, and he therefore follows the line of least resistance which ultimately affects society. In such conditions as these psychoanalysis is a valuable instrument. The root of the repression is found, the energy is directed toward the correct channel, and not infrequently a cure is effected.

However, Freudian treatment does not always lead to success. For instance, Freud often recommends sublimation of desires that cannot be gratified in their original form. In other words, he advises that the electric current toward the sex organs which, for some reason or other, cannot be allowed to flow freely in that direction, should

be re-directed toward a different channel. Such advice is erroneous. Each sense organ can carry and utilize only its allotted quota of energy and to charge it with the energy rightfully belonging to an organ may prove disastrous. When the sexual power is turned off, that outlet is killed, the energy is not utilized elsewhere, and all the associated sense organs are injured as a result. The body is a complex of closely allied organs. We have observed that if the sexual glands are extirpated, the thyroid, the pituitary and the adrenals are at once weakened. Again, if one of the adrenals is removed, the sex glands, the pituitary and the thyroid are affected. For this reason, sublimation of one desire in another direction is inadvisable.

Psychoanalysis and Repression

Estelle, a young girl of seventeen, was brought to us for treatment. She was pale, sluggish, lazy, indifferent and self-centered. She was suffering from epileptoid fits followed by unconsciousness.

Analysis revealed violent egotism, exhibitionism, unreasoning hatred of rivals in charms or accomplishments and terrible fear of personal slights. Upon inquiring into her past history, it was found

that one year before her first fit her mother had had an attack of ptomaine poisoning during a picnic in the country. This attack was so severe that it almost caused her death. The dominating thought in the child's mind at that time had been "Maybe mother will die!" It was an unconscious wish for her mother's death followed by remorse and repression.

Estelle's first fit occurred at a party when everyone was praising and pampering a child of four. Estelle stole the applause, rather, the attention of the guests from the child and transferred it to herself. The symptoms of the oncoming fit were nausea, accelerated heart-beating, dilatation of the pupils, contraction of the muscles of her fingers, hands and arms, and then complete unconsciousness.

Psychoanalysis was tried and proved successful. Physical examination showed that Estelle had adrenal hyperfunction, followed by adrenal depletion which brought about muscular weakness. As for the fits, they were caused as a reaction against her repressed anger at not being the center of interest. It is difficult to say whether the fits occurred because her adrenals were not adapted to a certain strain, or whether the strain resulted from unadapted

thoughts. In any case, in order to effect a definite cure both the glands and the mind had to be treated.

What is really necessary in modern curative medicine is a synthesis of what science, surgery, neurology, psychology and endocrinology have discovered on the subject of human thought and its mechanism. The sooner this is realized, the greater will be the advantages to the human race.

Autosuggestion and Coueism

It has been a source of wonder to the thinking public to determine the cause of Emile Coué's cures by the simple process of autosuggestion. "What is autosuggestion and how is it practised?" are the most common questions of the day.

Autosuggestion is as old as Adam. It has its root in the unconscious mind, and since the mind is as old as man, so also is autosuggestion as old as mankind. There have always been individuals who have practised suggestion. Christ may be mentioned as one, for how else could the modern world logically interpret many of His miracles? In the New Testament St. Paul, in speaking of prayer, outlines very explicitly nothing other than the methods of auto-

suggestion. Throughout the course of civilization its principles have been used, in ignorance, it is true, but nevertheless with good results. When the Christian martyrs met their doom in the arena in the toils of wild beasts, what was it that inspired them with fearlessness for their fate and with hope for the future? Autosuggestion. When, during the Inquisition other martyrs unflinchingly suffered the most atrocious tortures that fanaticism has ever devised, what was it that fired their courage and kept their faith alive? Again, autosuggestion. Of course, like everything else that is not understood and that is enshrouded in the black mantle of occultism, autosuggestion has had its Cagliostros and its Svengalis. What was the wholesale burning of witches at Salem if not the protest of the uninitiated against the unfair usurpation on the part of the initiated, or witches?

To-day autosuggestion is no longer an occult science to be used by those in league with the devil to the detriment of pious ignorant human beings. It is a convenient tool within the reach of all who care to use it, and it has been so simplified that as the disciples of Coué exclaim with pride, "Even a child can use it."

The Coue Method

During this past year Coué's method of autosuggestion has swept Europe and America like wildfire. What is there then in the method that meets such universal approval? Is it the excellence of the method itself, or is it a timely panacea to the needs of a gullible generation? The fact remains that millïons are daily repeating Coué's formula in the same breath as their Paternoster, and claim to derive great benefits therefrom.

Like psychoanalysis autosuggestion lays its cornerstone in the lap of the unconscious. It is by using the unconscious self as an instrument that the soil for a good suggestion is laid, from which will be reaped the fruits of health and the strength to take part in the battle of life.

To Coué the unconscious and the imagination are one and the same. Contrary to the view commonly held that it is the will, or the conscious mind that governs life, Coué maintains that the imagination or the unconscious will is the controlling force. To prove his point Coué gives a simple but convincing instance.

"Suppose," he says, "that we place on the ground

a plank thirty feet long by one foot wide. It is evident that everybody will be able of going from one end to the other of this plank without stepping over the edge. But now change the conditions of the experiment, and imagine this plank placed at the height of the towers of a cathedral, who then will be able of advancing even a few feet along this narrow path? Could you hear me speak? Probably not. Before you had taken two steps you would begin to tremble, and *in spite of every effort of your will* you would be certain to fall to the ground. Why is it then that you would not fall if the plank is on the ground, and why should you fall if it is raised to a height above the ground? Simply because in the first case you *imagine* that it is easy to go to the end of this plank, while in the second case you *imagine* that you *cannot* do so."

Taking the imagination as his point of departure, Coué impresses upon the mind of his subject a suggestion which, when given credence, will effect whatever is desired, within the limits of the possible. Thus, when a woman suffering from acute abdominal pains during menstruation, causes her imagination to believe that the pain is going . . . going . . . going . . . it will be gone in a few minutes.

General and Specific Suggestions

Coué impresses upon his subjects to begin and end the day by repeating twenty times the general suggestion, "Every day, in every way, I am getting better and better." The charm of this formula lies in its inspiring the individual with faith in his progressive improvement in every way.

Besides this general suggestion, Coué has specific suggestions for various ills. If a patient suffers, let us say, from indigestion, Coué has him impress upon his imagination the suggestion that all the organs acting upon his digestion are doing their work well. He will have him recite something like the following, "My saliva is flowing normally; my teeth are masticating the food well, my stomach is working properly . . . etc., etc." It is a principle of Coué's never to allow his patients to dwell upon or discuss their symptoms, for it is his opinion that such talking only tends toward planting noxious suggestions.

The Mind and the Glands

It is well known that one's attitude toward life insures success or failure. Just what effect auto-

suggestion would have upon the proper functioning of the glands cannot be exactly determined. Yet there is good reason to believe that since the glands are controlled by the sympathetic or involuntary nervous system and since the subconscious mind governs the latter, a specific suggestion rightly planted might lead to beneficial results. However, this method cannot always be employed with neurotic, fear-ridden subjects, for to begin with, they would not readily accept a suggestion, and secondly, too much depends upon the patient himself for any good result to be effected.

Often in the case of impressionable patients, vicious circles have a tendency to establish themselves. The organism falls easily into habits, habit being the line of least resistance. Let us say sickness has weakened a gland. Weakness develops and the patient broods over it. Discouragement and despondency in turn weaken the gonads and the adrenals even more, and bring about deficiencies which create a sense of inferiority.

The inferiority soon becomes an article of faith in the patient's mind, and the mental suggestion that he is continually offering himself, "I am weak," only tends to prevent the normal exercise of a gland.

Such are the cases of psychic impotence, for instance. Since fear in itself is a sufficient cause for impotence, the man who fears impotence is impotent from the very fact of his fear. In such cases the sowing of a correct suggestion will do much toward the removal of the fear and the inspiring of the individual with the confidence necessary for him to assert his manhood.

CHAPTER XII

HOW THE GLANDS AFFECT APPEARANCE

"Love at first sight" and "First impressions count" are colloquial expressions with which we are all familiar. What is it that draws or repels upon first encountering an individual? Surely it is not the spirit or the intellect. It is simply the physical appearance. We may admire brain but we love beauty. Woman is instinctively drawn to the strong and man is charmed by a pretty face and a graceful body. Irrespective of how much we try to suppress the physical it will out. Though beauty may attract and not be able to hold, even to attract is half the battle won. It may be safely said that the vast majority of marriages and practically all the marriages of youth are based on physical attraction. We may speak of the attunement of tastes, of harmonious dispositions, of kindred spirits, but these are only fine-sounding phrases. Youth, when he selects his mate, is not far different in his procedure

from his ancestral ape. The veneer of civilization is rubbed off and he reverts to his instincts. He does not write odes to her intellect or to her spirit, but passionately eulogizes her "windows of the soul," her shell-like ears, her pomegranate lips, her golden locks, her lily fingers and would fain gaze on the "round rising hillocks" of her breast.

The Doctors of Matrimony

Foolish indeed would it be to disregard the physical when it plays such an important rôle in life. Until now we have described the relation between the glands and the mind, but even as the character of the internal secretions affects the temperament, it also affects the physical appearance. The height, the corpulence, the formation of the skeleton, the texture of the hair, skin and nails, the shape of the nose, the development of the teeth, the color of the cheeks, in short, the structure of the whole body depends upon the activity of the endocrine glands. Knowing as we do the temperamental characteristics associated with the various glandular disturbances, we have a guide by which to judge whether the individual we are to marry is compatible with our nature by determining the physical signs of the

glandular disturbances. This opens a new field for social workers, and from this knowledge of the physical manifestations of the activity of the glands there may a rise a new profession,—that of the doctors of matrimony, who will examine those about to marry, diagnose the endocrinological status of each, and decide upon the suitableness of the union.

The Various Physiques and their Mental Significance

The stature of the body is determined by the rate and the extent of growth. It has already been shown in a previous chapter that growth is dependent upon the pituitary gland. The giant of hyperpituitarism and the dwarf of hypopituitarism have been described. However, there are many intermediary types which come within the range of normalcy and pivot about the same fulcrum, the pituitary.

The tall type, strong, muscular, thick-skinned and large of hands and feet; the toughened, hardened veteran of the outdoor, with hairy hands, chest and legs, a prominent nose, a square, somewhat protruding lower jaw, thick, bushy eyebrows, an oval face and a square head is the product of too much

pituitary secretion. This type is sagacious, intelligent, self-willed, self-controlled and prudent. The prudence may go so far as to become sordid calculation.

The lean type, clean cut, smooth-faced, with thick hair, long eye-lashes, sinuous eyebrows, glittering, prominent eyes, sparkling white teeth and a sensitive mouth is the product of too much thyroid. This type is unstable, impulsive, restless, emotional, lacking in tenacity and endurance and suffering from insomnia. He may also suffer from exaggerated cerebral excitation which keeps him up at night planning and scheming.

The slender type, fair of face, delicately tinted, with a narrow waist-line, rounded limbs, a curved outline, a long chest, white, hairless skin, soft, silky hair, small, pearl-like teeth, and usually knock-kneed or flat-footed, shows evidence of involvement of the thymus gland in addition to the others. This type is easily led and becomes a cat's paw for others. He is frequently the passive or submissive pervert. He is weak, irresponsible, peevish and often dishonest. In the hands of a Fagin he becomes the pickpocket, the petty thief, the drug addict, and if a

woman, the enslaved prostitute bandied from brothel to brothel, unable to extricate herself.

The short, sallow type, stout, with pudgy hands that are cold and blue, with a high forehead and deep-set colorless eyes, slow of mind and slow of movement, is indicative of a decreased activity usually of the thyroid and the pituitary. This individual is apathetic, listless and easily influenced.

The types we have described are more or less clear-cut, and point to the involvement of a particular gland; but there are numerous combinations and shadings giving rise to mixed appearances. We may have pituitary-adrenal types, thyroid-thymus, or pituitary-thyroid-adrenal types. However, as a rule, even in the most complex make-ups we are able to determine the symptoms of a predominating gland.

Physiognomy

Each glandular or pluri-glandular personality has individual peculiarities that differentiate it from the others. Every face, besides the lines of age and vicissitudes, has the stigmata of the endocrine glands. We have the thyroid physiognomy, the pituitary, the adrenal, the thymus, in the various

degrees of hypo, hyper or dys. We said before that the glands are the sculptors of the organism. More so does this apply to the modeling of the face, as well as its color and tint. They are not only the sculptors, but the artists as well.

A long, somewhat oval face with pronounced bone structure, straight nose and strongly marked eyebrows, tranquil in expression and intelligent in the *tout ensemble,* marks the hyperpituitary type. Hypopituitary faces show the opposite, both in shape and expression.

Adrenal faces, denoting a hyperactivity of the glands, are often of a pronounced brunette complexion or generously freckled. There is also a bountiful growth of hair in the hair areas, as about the brows and on the upper-lip and cheeks in males, sometimes the hair extending even over the cheek-bones. In form the face is broad and somewhat heavy.

Hyperthyroid and hypothyroid individuals we have already described. Suffice it to say that to the hyperthyroid belong such spiritual faces as that of young Raphael, while hypothyroidism is materialized in the well-known type of the cretin and the myxedematous types.

The Eyes

The eyes by their structure and expression reveal the emotional occurrences within the body. We are all acquainted with the startled eye that portrays fear, and know that fear is caused by over-stimulating adrenals. The dilated pupil of relaxation is part of the symptomatology of lessened glandular activity, whereas the contracted pupil is found when the glands are hyper-secreting.

The most distinct types from an endocrinological viewpoint are the pituitary and the thyroid eyes. Hyperthyroidism produces the bright, luminous, large emotional eye, commonly found among artists. The prominence of the eye is dependent upon the amount of excessive secretion. From the attractive large eyes to the repulsive bulging eyes of exophthalmic goiter is simply a question of how much thyroid hormone is poured into the blood-stream. An abnormal amount of white about the pupil indicates a passionate nature, emotional instability and lack of depth. A decrease in the thyroid secretion is apt to give a dim, deep-sunken, cheerless, dull eye. The curving of the upper and lower lids is imperfect and sometimes the eyeball is obliquely located, giving the

impression of cat's eyes. This type is frequently found in congenital criminals.

The pituitary is met with in observers, truth tellers and thinkers in general. Their eyes are wide apart, sunken but distinct, set off by eyebrows which tend to be bushy and meet over the bridge of the nose. Associated with this type there is a high forehead, all of which put together give the appearance of sagacity, erudition and loftiness of mind.

The relation between sex, the eyes and the glands is worthy of note. "To eat with one's eyes" and "to look through one" are popular expressions that seem to have a scientific basis. The perspicacious eyes are characteristic of the hyperpituitary personality, and passionate eyes are associated with hyperthyroidism. Colorless, dry eyes that do not show any sparkle or quickening upon sex stimulation are found in eunuchs, cretins and some types of dwarfs. The oblique, slanting eyes of polygamous nations are well-known. Eunuchs in polygamous countries often do not show these typical eyes. On the other hand there are individuals born in monogamous lands that show just this form. Which of these individuals are polygamously inclined we are unable to tell, but whatever the case may be

there does seem to be a correspondence between the structure of the eyes and polygamous personalities.

The Teeth and What They Tell

We have learned that the bony development of the body is dependent upon the proper functioning of the endocrine glands. The teeth are also bony structures and are necessarily influenced by the glands. In fact, the normal growth and health of the teeth is directly governed by internal secretions. Too long have dentists been treating the teeth with no relief, not understanding the underlying endocrinological disturbances. This lack of knowledge is well-known in the treatment of pyorrhea alveolaris, a disease of the teeth and gums. The teeth are scaled, scraped, scalded, scoured and filled, crowned and extracted. The dentist admires his fine workmanship, and patting himself on the back sends the patient home cured, only to have him return later with a new attack. What is at fault? The glandular disturbance has not been regulated. The teeth of some people will decay in spite of all the care that may be given them, and the teeth of other people will be clean and healthy without even ever using a tooth brush. What is the explanation? The

glands of internal secretion have endowed these people with a different quality of bone, and one is able to ward off the disease, while the other is not.

It has been experimentally shown that the glands, particularly the thyroid and the pituitary, govern the calcium quotient of the body, and it is also known that bone formation depends upon the amount of calcium or lime. Soft bones are deficient in lime. If there is not sufficient calcium produced the acids in the foods are not neutralized and the teeth are eaten away. This is particularly true in children, therefore, in order to safeguard the teeth thyroid medication in children is indicated. Women who have had repeated pregnancies are apt to lose their teeth. The old saying "For every child a tooth" is not far from right. The explanation for the loss of teeth with pregnancy is that the thyroid and the pituitary overwork until exhaustion sets in. Consequently there is a lack of secretion and a shortage of the calcium necessary for the teeth.

The Thyroid and the Teeth

The teeth of the thyroid personality are slender, thin, glistening, transparent, small, regular in alignment, pearly or bluish-white in color. When such

teeth are found, dental treatment alone is insufficient. The administration of thyroid gland is necessary to prevent their decay and decomposition.

The Pituitary and the Teeth

The pituitary teeth are large and square. The inter-dental spaces are marked and the middle incisors are prominent. Sometimes the teeth are the only sign of a beginning gigantism. The use of glandular therapy at such an early time may prevent the development of gigantism.

The Adrenals and the Teeth

Even as the adrenals are the glands of pugnacity, so the canine is the tooth of strife. Upon the sharpness of the canine teeth depends the ferocity of the animal, and, strange to say, the development of the canine depends upon the activity of the adrenals. An increased secretion is associated with large, powerful canines, and a deficient secretion results in short, stumpy, dull ones. In addition, it has been discovered that the adrenal type of teeth show a reddish-brown coloration, and though comparatively soft in texture have a great power of endurance. It is not uncommon to find old people with

their teeth well-preserved. However, if these are examined, they will be found to be short and brownish,—the typical adrenal teeth. This is the type that exists in spite of tartar, dirt and neglect.

The Gonads and the Teeth

The upper middle incisors are affected by the pituitary but their neighbors, the lateral incisors, seem to be under the domain of the gonads. Congenital abnormalities in the sexual glands are associated with abnormalities of the lateral incisors. The relationship is supposed to be crossed, the right ovary or testicle being affected simultaneously with the left upper lateral incisor. Cases have been reported where a woman having an atrophied or absent ovary on one side was found to have a small, or no lateral incisor of the opposite side. Kaplan states that "The ovary should always be suspected where pelvic pain is manifested in a patient whose lateral incisors are abnormal. In the male, small stumpy laterals bespeak sexual impotence on a physical basis."

The Thymus and the Teeth

The thymic type of tooth is, like the thymus gland, found in the young. The thymic teeth are

the baby teeth. They are usually of the pituitary or thyroid type, with the addition that they are milky-white or bluish in color, translucent and very thin at the grinding edge. The presence of the thymic teeth signifies underdevelopment which may be mental and physical. Infantile complexes and reversions may be among the psychic manifestations.

The New Dentistry

With the fuller understanding of the influences of the internal secretions upon the teeth, a new dentistry will develop. When a child presents twisted, irregularly placed teeth, instead of harnessing up the mouth in metal frames a possible underlying glandular cause should be sought. If found, the dentist should give way to the endocrinologist. When a youngster's teeth have a tendency to crumble and decay, they should not all be extracted, leaving the poor fellow toothless like an old man. He should be put on glandular therapy and the results observed.

Chayes, summarizing the relation between the glands and the teeth, concludes that the *time* of dentition is a thymo-pituitary function, that the *position* of the teeth depends upon the thymus, the pituitary and the gonads, that the *quality* of the teeth

is dependent upon the thyroid and the pituitary, and that the resistance of the teeth against decay and infection is a thyroid function.

The Skin

The glands determine the quality of the skin. Color, which is the most striking characteristic of the skin, is dependent upon the activity of the adrenals. The bronzing of the skin found in Addison's Disease is an example. The famous liver spots are probably of adrenal origin.

An increase in the secretion of the thyroid gives a moist, warm, smooth skin, due to the stimulation of the sweat and wax in the skin. The same effect is accomplished by a decrease in the adrenal secretion, which does this by reducing the tone of the muscles and allowing an overflow of moisture. People suffering from adrenal insufficiency perspire freely, and this excessive perspiration may be considered indicative of weakness. Hypothyroidism and hyperadrenalism, on the other hand, produce a dry, thick, rough, course and cold skin. The thymus lends the soft smoothness of youth.

The fulness of the skin depends upon the under-

lying strata of fat, and the amount of fat present depends upon the activities of the internal secretions. The hypertemperamental personalities, irrespective of which gland is involved, are devoid of embonpoint, whereas the hypotemperamental individuals are usually obese. A persistent pineal also tends toward obesity.

The health of the skin can well be gauged by its elasticity. The flabby, inelastic skin hanging in folds, is characteristic of the declining years of life. Experimentally, removing the thyroid gland has been followed in a comparatively short time by a loss in the elasticity. This has conclusively proved that the internal secretion of the thyroid is instrumental in maintaining the resiliency of the skin.

An interesting property of the skin is its reaction to external stimuli. Stroking it gently will produce either a red or a white line, depending upon whether the individual is of the hyperthyroid or the hypoadrenal type. The red reaction is known as dermographia, and the white one as the "white line of Sargent." Similar color changes are found upon emotional disturbances. Some people turn a blood red, while others a livid white when subjected to the same excitement.

The Appendages of the Skin

The appendages of the skin are the hair and the nails, both of which are markedly influenced by the internal secretions of the endocrine glands. Practically all the glands, the pituitary, the thyroid, the thymus, the pineal, the adrenals and the gonads frequently affect the growth and distribution of the hair. Each endocrine organ tends to give features peculiar to it, but as a rule the intermingling of the various secretions produces a balanced result, so that it is difficult to determine without close observation which gland is the predominating factor.

The adrenal glands are to a marked degree the controlling agents in hair distribution, especially of the hair of the abdomen, back and chest. We have already spoken of the hairiness and the general sex precocity that occurs when the adrenal glands suffer enlargement in childhood. In the adult the adrenal type is marked by a thick growth of hair on the chest in the male, and on the back in the female.

Pituitary distribution is somewhat different, in that it is usually thicker and more generous upon the hands, arms and legs. Otherwise the adrenals influence hair growth more than the other endocrines.

Besides exerting marked influence upon the body

hair, the adrenals also act upon the sebaceous or oil glands.

The chief influence of the thyroid gland manifests itself upon the growth of the head hair. In cretins and myxedematous individuals, the hair of the head is sparse, straight and brittle, and when thyroid treatment is given there is a pronounced change, the hair becoming thicker, finer in texture and more lustrous.

Psychoanalysis, Endocrinology and Appearance

The psychologists of the unconscious in treating pathological subjects always took the mind as the point of departure, disregarding the physical appearance of the subject completely. To-day, in the light of new discoveries, the formation and structure of the body cannot be cast aside so easily, for often, in an apparently trivial physical eccentricity may lie the germ of a serious complex. The physical appearance of every subject presented for treatment must therefore be minutely examined. The pigmentation of the skin, a mole, an unusual formation of the fingers, an extraordinary brittleness of the hair,—each phenomenon has a reason for being, and like the little flower growing in the crannied wall, it may contain within it a universe of things.

CHAPTER XIII

FEEBLEMINDEDNESS AND DELINQUENCY

Since Lombroso with his types of congenital criminals, the medical, anthropological and sociological fields have been swamped with theories dealing with the criminal and the man of genius. Though Lombroso's views are not given to-day as much credence as they received subsequent to the publication of his voluminous works, modern endocrinology tends to demonstrate that many a structural departure from the normal is to be found in individuals suffering from abnormal functioning of the glands of internal secretion. Lombroso claimed that criminals always revealed in their physical make-up certain stigmata of degeneration. He painted accurate word-portraits of the congenital delinquent, and the remarkable part of his study was that upon being applied it worked. Nevertheless, universal application brought out its weak points. It was found that many of the so-called stigmata

of degeneration, far from being peculiar to criminals alone, were not infrequently found in the moral pillars of society. Every individual, no matter what his stratum, possesses certain ear-marks, certain propensities, the exercise of which would lead to the foundation of many more anti-vice societies than those already in existence. Such potentialities do not necessarily brand him a criminal. When too many of them, both physical and psychic, are present in an individual, and when, far from being inhibited and remaining potentialities, they become too disastrous actualities, to the detriment of society, that man is called a congenital criminal.

The congenital criminal does exist. In the minds of man he is often judged on his face value. He is the submissive tool of the normal, thinking genius of crime,—the mind of noxious enterprises. Of the two types of criminals the former is the evil, though innocent caprice of Nature; the latter, the ingenious and culpable product of Society.

The Types of Mental Defectives

Mental defectives have been divided into three groups, the morons, the imbeciles and the idiots. The first are the most intelligent, the second, less so,

and the third, hopelessly feebleminded. Binet and Simon, two French psychologists, devised a scheme of measuring human intelligence. This scheme consists of a series of questions graduating from the most simple to the most complex, proportionate to the age of the subject examined. According to this test the intelligence of an individual may be expressed in terms of percentage. It has been found that the idiot possesses about twenty-five percent of the intelligence of a normal being; an imbecile is endowed with from twenty-five to fifty percent; while the moron's intelligence ranges from fifty to about seventy-five percent or over. Those cases possessing a quotient of intelligence ranging from seventy-five percent to about eighty-five, have been designated as border-line cases, for while they show aberrations in certain respects they are normal in others. It is the borderline group that is the greatest problem of the psychologist and sociologist. The Binet-Simon test is undoubtedly of great value, but the criterion of normalcy is the reaction and adjustability of the individual to his environment.

The study of mental deficiency as a distinct entity is a matter of comparatively recent date. Formerly the feebleminded would either wander about the

streets, the buffoons and targets of all about them, or be confined in asylums for the insane. To-day we consider the feebleminded as a class by themselves, and every country has built or is building special institutions for housing these poor victims. It is interesting to note that the female feebleminded manage to keep out of institutions longer than the males, perhaps because though deprived of mind they still possess a body that can be sold.

Curable Mental Deficiency

Of course it is folly to seek to apply curative methods in cases such as that of the Mongolian idiot. As successfully might one try to bring the genius down to the level of mediocrity. Both the genius and the idiot are what might be called biological sports. They occur without any *raison d'être,* and any attempt to fit one or the other into the common mold results in failure.

There are types of psychic abnormalities that are curable, for their root lies not in the mind but in the body. Cretinism and myxedema are derived from malfunctioning of the thyroid gland. Other forms of mental deficiency spring from oversecretion of the pituitary gland. Still others are caused

by pluriglandular deficiencies. All such cases of mental deficiency respond to glandular therapy if preventive measures are taken before the evil have progressed beyond the bounds of treatment.

Voronoff reports a case of cretinism which he cured by means of the transplantation of the thyroid gland of a monkey into a youth of twenty. Even though the boy was far beyond puberty, the results obtained were most encouraging.

Voronoff's Cures of Cretinism and Myxedema

Georges P..... in his twentieth year was no more advanced in intelligence than a domestic animal. He did not know how many fingers he had in his hand, nor could he speak in complete sentences. Whatever phrases he did utter were poorly articulated. Transplantation was performed in 1915. After the lapse of a few years he could write well, read with average ease and play the piano. He even helped to bear the expenses of the household by aiding his parents in their business of pastry-making. He no longer looked feebleminded, but was clear-eyed, intelligent and answered with common sense whatever questions were put to him.

On another occasion Voronoff cured another boy

suffering from an alteration of the internal secretion of the thyroid after measles.

Jean J..... presented all the ear-marks of feeblemindedness. He was slow, dull, with a flabby, expressionless face. He spoke with difficulty and said little that could be understood. At school he did not keep up with the pace of the other pupils and soon ceased to make any progress at all. Several physicians were consulted, one of whom placed him under glandular treatment. He was given thyroid tablets at the rate of two a day, for the space of three months. The boy improved. The swelling of his face, abdomen and limbs, from which he had suffered, decreased. His hair, which had been thin and sparse, became more abundant. His intelligence, also, awoke little by little. However, when the treatment was discontinued for a fortnight or so the progress was arrested and there was a general regression to the former state. Voronoff came to the conclusion that a permanent cure could be effected only through the grafting of the thyroid gland of a monkey upon the boy.

At Nice, in the presence of several authorities on the subject of endocrinology, the thyroid lobe and

the corresponding parathyroid of a monkey were removed and transplanted into the boy. When the thyroid and the parathyroids were completely removed from the monkey it died of tetany. As for the boy, the resulting changes were marvelous. His movements were no longer lethargic and dull, but became more and more lively. His intelligence awoke, and at school his teachers were unanimous in expressing their wonder at the vast change between the dullard of the past and the bright boy of the present.

Mental Retardation and Mental Deficiency

A survey of the schools of the United States shows an attendance of about 22,000,000 children. Examination of these children has shown that fifty to seventy-five percent are suffering from physical defects. Due to these causes fifteen percent drop out or are discharged from school before the end of their school career. About sixteen percent are demoted or left back, and seventeen percent more are retarded, making irregular and indifferent headway.

The relative frequency and type of defects found are best given in the following tabulation:

Dental defects (decayed teeth)	50–75%
Nasal obstruction (chiefly tonsils and adenoids)	15–25%
Malnutrition (undernourishment)	15–25%
Defective vision (poor eyesight)	25% and up
Orthopedic defects (bone deformities)	10–20%
Defective hearing	5% and up
Heart diseases	5% and up
Mental defects (idiots, imbeciles and morons)	1%

From the above table it may be readily seen that an actual mental defect as a cause of mental retardation is rare, since it occurs in only one percent of the cases. On the other hand, physical defects are the common causes. In the tabulation given, no mention is made of glandular diseases, probably because the children were not examined in a manner to bring out any such disturbances. However, we may rest assured that a goodly number of dental defects, orthopedic malformations and cases of malnutrition were due to an improper activity of the endocrines. In such cases the correction of the physical defect and the regulation of the disturbed glandular activity would undoubtedly remove the mental retardation, causing the dull and backward to become bright and proficient.

Where there is an actual, innate mental deficiency, which cannot be accounted for by physical defects and glandular disturbances, no system of teaching, no psychological treatment and no endocrine therapy will be of value.

The Mentally Deficient Criminal

Not all feebleminded individuals are of criminal tendencies, nor are criminals necessarily feebleminded. Indeed, many types of ingenious bank-robbers and forgers are very far from being deficient mentally, judging from their intricate plans. Yet there are types that are predisposed naturally to a career of crime, types that even in their physiques evince abnormalities.

Let us take the man with an exaggerated skeletal structure, with a massive face, abnormally large hands and feet, thick, oily, hide-like skin and other characteristics of the hyperpituitary personality. By temperament, as we have already shown, he is disposed toward a certain type of behavior. Then again, let us revert to the hyperthyroid type. With his emotional, impulsive nature, due to the excessive functioning of the thyroid gland, he figures very often in crimes of passion. Patrizi, an Italian in-

vestigator who has studied many notorious delinquents of this nature, finds that the thick-browed, hairy, wide-eyed, hyperthyroid individual is accompanied psychically by traits of emotional instability, unsteadiness of mind, impulsiveness and irresponsibility, all of which are instrumental in causing passionate reactions.

The antithesis of this type is the hypothyroid, the dull, easily-led person, often the member of a gang because on his own initiative he could not accomplish as much as with the aid of others.

James G....., fourteen years old, was arrested for breaking into a store, running away from home and sleeping in freight cars. He was a New York boy and was picked up by the police in North Carolina. He was sent to the New York Society for the Prevention of Cruelty to Children, where he was kept in custody until the day of his trial.

His father and mother were sedate, respectable working people. The home was comfortable and well furnished. There was no want, and at no time had the boy been in need of any funds. At school he had made fairly good progress until he had reached the fifth term, when he could make no further headway. At the present time, though fourteen years old,

he was still in the same grade. He liked to play, but usually with children younger than himself. He was considered the booby of the neighborhood.

The story of his escapades was that one day after school, at the instigation of two boys, he broke into a candy store which had been temporarily closed. He had taken a few dollars from the cash drawer (the exact amount of which could not be determined), as well as candy, cigars and cigarettes. All of this loot he handed to his confederates, who gave him as his share some candy and half a dollar, telling him that "they would beat the life out of him if he would snitch." In addition they had intimidated him by threatening to tell the police and inform his parents of the burglary. Afraid to go home, he made for the railroad station and jumped into a box car, which eventually landed him in North Carolina.

Physical examination showed a poorly-nourished and underdeveloped boy. The skin was dry and coarse, and the hair brittle. The eyes were expressionless and there was a general lackadaisical air about him. Mental examination revealed an intelligence of about seventy-five percent, which definitely placed him in the moron group. A diagnosis

was made of myxedema, and thyroid extract was administered. At the end of six months he showed marked improvement. He passed his grade at school, his eyes gained luster, and in general he was brighter.

The Sexually Delinquent Mental Defective

It is well known that a great number of prostitutes are feebleminded. Women of this caliber who are normal become the madames, the leaders, and sooner or later leave for various public careers. It is an open secret that a great many women who are before the public eye have begun their career by leaving their morals behind. Of such we are not treating at present. We are interested only in those who because of their mental handicap are not aware of the true significance of their position.

Rose D....., seventeen years old, was a maid in a private home. She had left school a year previously at the grade of 4B. Since that time she had had various positions lasting from one week to a month. She was a gaudy dresser and used all the cosmetics she could appropriate, though she was naturally pleasing to look at. On several occasions she had committed petty thefts. It was not unusual for her to receive as many as fifteen or twenty tele-

phone calls a day, each from a different man. For a girl of her age she possessed too thorough a knowledge of sex matters.

At the first glance one was prone to think her normal in every respect, but on speaking for five minutes with her one could easily detect that there was something wrong. A Binet-Simon test showed that she had a mental age of eight years and six months. She could do housework fairly well, but only under command. She had no initiative except when it came to dancing, going to Coney Island, buying silk-hose and baubles, going to the movies and eating candy and ice-cream.

On a certain occasion she failed to appear for two nights in succession. Investigations were made, and it was found that she had been out in an automobile with four men, all of whom had assaulted her and then had threatened to have her put under arrest. Terrified, she ran away, and having been away one night, she was afraid to return the next, and therefore slept at the home of a friend.

She was brought to court as a morally delinquent juvenile, and because of her mental deficiency two experts in nervous and mental diseases advised her commitment to an institution for the feebleminded.

The judge, biased probably by her physical appearance disagreed, and she was freed. Six months later it was learned that she had had a criminal abortion performed, and that she was joining the ranks of the *filles de joie.* At no time in her life had she ever received money for any of her indiscretions. An automobile ride, a box of candy, a trinket, or just sufficient coaxing was enough to gain her consent. To use her own words, "When a feller is nice to you, you gotta be a good sport."

The Mentally Defective Sexual Perverts

Among the mentally defective are often found individuals suffering from sex aberrations. There are several reasons for this. To begin with, mental defectives are passive, docile and easily led. Rather than struggle, they follow the line of least resistance, and once they fall within the clutches of an unscrupulous person, there are no depths of perversion to which they will not sink. Then there are types like the thymus personality, frail, weak-willed and effeminate. These are endowed by nature with psychic as well as physical peculiarities which are prone to lead them into the pathological paths of sex expression. Then, too, there is the androgyne or

man-woman, often accompanied by hypofunctioning of the pituitary gland. Such creatures are women with the generative organs and minor characteristics of man, but with the psychic make-up and secondary sex traits of woman. In their sex-life they do not exert masculine aggressiveness, but submit passively to the advances of vigorous males. In their dress, behavior and mannerisms, they have all the coyness and allurements of women. Indeed, they are women whom nature chose to mask in the external shell of man. Often perversions are nothing more than the persistence of infantilism, developing into complexes and expressing themselves sexually in abnormal ways. Such cases are not infrequent among mental defectives, for being infantile in mind they are also infantile in their sex expression.

The Androgyne Pervert

In the androgyne the propensities toward pathological sex expression are innate and not amenable to cure. Physically he presents all the peculiarities of the anomaly, being neither purely male nor completely female. Psychically he is female. The androgyne is not necessarily mentally deficient, for there have been cases where a brilliant mentality ac-

companied whatever defects nature may have endowed with him.

R. T. was an androgyne. To all appearances he was a normal male, only that his voice was of feminine timbre and his mannerisms were not peculiar to the male. Since his early childhood he had had a desire for affection, and expressed it in uncommon ways. His playmates, and later the young men who worked in the same garage where he was employed, discovered his peculiarity and often indulged him, more for their own sake than for his. Others of the more depraved type sought him out, and though he needed no coaxing, decoyed him with small presents of money, cigarettes and articles of apparel such as gaudy ties and clocked sox.

One night, he and another garage boy were arrested in a park, and were brought to court on the charge of sodomy. The other boy was found normal upon examination.

Physical examination of R..... revealed the usual hypopituitary personality, full-breasted, soft-skinned, round-hipped and with the female distribution of hair. The intelligence test showed him to possess the mental age of a boy of nine. Since no cure of the defect was thought possible in his case,

he being a congenital pervert, he was committed to an institution for the feebleminded.

Clothes Fetishism

Jack R....., thirty-two years old, was employed as a messenger by a well-known house. Though he had been employed for many years, and had been entrusted with articles of great value, he had never evinced the least signs of dishonesty. Once he was brought to court accused of having intentionally torn clothes that had been hung upon a line to dry. Upon being interrogated for the reason for his behavior he broke down and told the court that whenever he saw clothes hanging out to dry he was aroused to an uncontrollable pitch of excitement which did not subside until he had pulled them off or torn them.

Upon being examined he showed a fairly normal masculine physique, though with some peculiarities of hair distribution and breast formation. He also revealed subpituitary and subthyroid activity. The Binet-Simon test gave him a mentality equal to that of a child of eight and a half years. He had never had sex relations of any kind, deriving all his gratification from destroying clothes.

Psychoanalysis was tried upon him with slight

success, for since he was feebleminded he could not offer the cooperation necessary for an effective cure. Gland therapy proved more successful, and had it been tried earlier Jack R..... might have been regenerated into a normal being. As it was, through instilling fear by threatening arrest at another attempt, his clothes complex was gradually removed, and he was able to resume his work.

Climate, the Glands and Murder

In studying the influence of climatic and environmental conditions, it has been found that they are in no small degree instrumental in molding the physical and therefore the psychic make-up of a human being. It is well-known that warm climate, sunlight and the sea stimulate the thyroid gland to excessive activity. In southern climates the hyperthyroid type predominates, while in the north, among the mountains where the atmosphere is colder, the thyroid is not stimulated but on the contrary may undergo hypo- or dysfunctioning. With the difference in the glandular activity, there is also an accompanying difference in temperament. Niceforo, an Italian, observed that such endocrinological changes harmonize with the diverging character that he found

between the Italians of the north and those of the south. For example, in the south, especially along the coast of Sicily, and even in the meridional coasts of Spain, the hyperthyroid type is very frequently met with. He is the active, agile thinker and doer, thick-browed and hairy, precocious of sex and intelligence and emotionally irresponsible, impulsive and variable. In just such sections of the world crimes of passion and jealousy over sex matters occur, and what is more, they are perpetrated in primitive, barbarous ways. The northerners, as contrasted with the southerners, are more poised and balanced. We have in the North of Europe the phlegmatic Englishman. Crimes of passion of which Englishmen are guilty are less frequent. It is said that the English are as a rule hypothyroidal, because of their proverbial use of carnivorous food, which alters the internal secretion of the thyroid.

CHAPTER XIV

DANGEROUS AGES

LIFE is a cycle of varied experiences, the greatest of which, because of its mystery, is death. Poets have sought similes and metaphors to express the wonder and beauty of life, when in an optimistic mood, and its emptiness and futility when the shadow of pessimism hung over them. Some have compared it to a long journey, the destination of which is the hereafter. Others, like the Mohammedans, looked upon it as a period of doubt, until the great *Certainty* of death seized them. Still others thought it all too brief, and like the French writer expressed in one bitter sentence the vanity of being brought into the world: "The instant one is born is a step toward death." Then again, it has been compared to a game played by a cruel Fate:

"'Tis all a checkerboard of nights and days,
Where destiny with men for pieces plays,
Hither and thither moves and mates and slays,
And one by one back in the closet lays. . . ."

The comparison of life which best suits our purpose is perhaps that of a long journey on an unkown ocean, full of dangerous reefs and swirling whirlpools, many of which will have to be crossed before the opposite shore has been reached. There are at least four great danger points that have to be traversed with safety before ripe age is attained,—the rocks of puberty, late adolescence, change of life, and the Charybdis of senility.

Puberty

The most significant change that occurs within the life of the human being is that of transition from the child to the adult, a change that in the past used to be celebrated with elaborate ceremonies, and which even to-day among contemporary barbarous tribes is accompanied by primitive rites. The ancient Romans, when their youths reached the age of puberty, had them don the purple-bordered garment of the adult. Among the Jews of to-day the confirmation ceremony of their boys is nothing more than the survival of the ancient custom of initiating them into the new mysteries of manhood. None of the modern ceremonies, usually pertaining to religion, is, among the civilized nations, accompanied by

bloodshed, although in South Africa there are still barbarous tribes that in the feast of the *ghanza* or initiation into adulthood circumcise their males and excise their females to the accompaniment of frenzied music. All this is done in public by the elders of the community. From then on the youths and maidens may indulge in all the privileges of adult life, for the *ghanza* ceremony has proclaimed them ripe men and women.

The Phenomenon of Puberty

Puberty is the period during which the maturation of the sex cells takes place, both in the male and the female. There occurs at the same time a change in the psychological attitude of boys and girls toward their opposite sex, rendering them more conscious of themselves and of each other. The consciousness that they may no longer behave toward one another as of yore is ever present in their minds. Young girls assume their rôle of feminine reticence and modesty, while boys, both in garb and manner, resemble young peacocks at mating time.

During puberty the body undergoes many changes. The ovaries in the female and the testes in the male

secrete their respective sexual products. Glandular functioning takes on an increased impetus in some glands and decreases in the case of others. The thymus and the pineal gland, both of which are most active before sexual maturity, undergo an eclipse, so that the activity of the gonads may progress in full force. The other glands, like the adrenals, the thyroid and the pituitary, also assume a place in the background, for unless this were the case the gonads would not be able to function properly, thus postponing, and perhaps preventing, maturity altogether.

Besides endocrinological changes, the body undergoes changes in its external appearance. In the female the breasts develop, the hips become rounded, the pubic hair appears, the height increases, and the girl blossoms out into a young woman, full of charm and allurement for the opposite sex.

In boys changes of similar nature take place. The shoulders become square and vigorous, the chest broad and hairy, the limbs firm and Colossus-like, the voice deep and masterly in timbre, while the whole psychic make-up turns confident and aggressive. Every obstacle is placed for the sole purpose of being overcome. All women exist to be wooed, and if love is intense enough, to be won.

The Dangers of Puberty

The dangers of puberty are psychic rather than physical, the physical existing only in pathological cases. It is during puberty that the seeds of the future man and woman are sowed, and unless they are well tended the fruits will be tainted. A young boy, living in immoral and perverted surroundings, cannot help being influenced by his environment, and when the incipient manifestations of sex present themselves, his first impulse is to imitate what goes on about him. These imitations soon become firmly rooted habits, difficult to eradicate.

Study has shown that from the ages of about nine to eleven young boys are inclined to be homosexual. This is one of the gravest dangers attendant upon the awakening of sex. It is a subject to be treated delicately by the parents or guardians, for upon the eradication of this vice in its incipiency depends the health and sexual happiness of the future man. The following hints might prove useful.

Don't use any threats. Inspire the boy with confidence in you and assure him that you will listen to everything he has to say without ever punishing or scolding him.

He must be made to realize the humiliation of such vices. Boys behaving as he does are like babies at the breast. Tell him that if people knew what he did they would laugh at him for being a suckling at his age.

He should be impressed with the danger incurred in practising this vice,—danger of diseases that might destroy his mouth, teeth and throat. He must realize the foulness of it all and the injustice he does himself and his manhood.

His generative organs are a sign of manhood. In ten or fifteen years he will have to marry and have children. If he continues in his vice he cannot marry, for he forfeits the respect of women, and thus he will be the laughing stock of the people with whom he is associated.

He must respect girls, for a real man always wants one of them to be his wife so that she may bear him children. The function of procreation should then be explained to him. When a husband and wife want to have a child, the husband embraces his wife and plants seed which he possesses into her body. If seed is put into the ground it sprouts and grows. The mother is like a garden, the father like a gardener who plants and tends the seed. When the hu-

man seed has ripened, that is, after a period of nine months, the child is ready to be born and comes out of the mother's body.

When he was too small and could not understand, people told him fairy tales about storks and doctors' bags. Now he is a young man and must know.

Such a method of presenting the facts of life to a boy at puberty cannot fail to impress him with the importance of his mission in life.

The Dangers Incurred by Girls at Puberty

With young girls the problem is different. Though love for one another does exist, it has a more spiritual touch. It is more of the heart than of the flesh. The dangers that are really incurred among girls are in too early an exercise of the function of sex. Being in most cases ignorant of the consequences of their action they may step into motherhood without realizing what they have done.

It is for their elders to explain to them upon the appearance of menstruation just what this phenomenon means. The mother or some other adult relative should take the young girl aside and tell her that now she is ready to carry on the work of life. Procreation should be explained in terms simple

enough to be understood, and without any false modesty. It is best that the correct facts are learned from reliable sources than that the girl receive surreptitious information on only the sensational phases of sex life.

The Adolescent Youth

The period between puberty and maturity is the danger period of adolescence. In males it begins at about the age of fourteen and ends at twenty-five; in females it sets in at the age of twelve, ending at about twenty.

As soon as puberty sets in the young boy is beset with a desire for sexual gratification. At times, unable to satisfy the normal desire in normal ways, he practises onanism, commits sodomy, or becomes the instrument of perversion in the hands of unscrupulous adults. With the suppression of prostitution the increase in clandestine vice has become more marked. Those who are able to pay sooner or later learn the password to the sanctums of illicit joys, little realizing the dangers they are incurring. It is usually the novice who suffers most through infection, first, because of his deliberate refusal to employ any measure that will in any way mitigate

sexual gratification. It is only after the novelty wears off that he learns to compromise.

Venereal disease often attacks young blood. It seems that older men can withstand infection much more readily. This may be due to a certain degree of acquired immunity. The young, not having such immunity, must learn to use artificial devices, and observe absolute cleanliness to ward off the danger of infection. Social hygiene talks, health lectures, preaching of morality, faith in religion are undoubtedly of value as admonitions, but adolescent males, when passionate, forget all about them and revert to an almost animalistic state with but one aim in view,—the pleasure of the moment.

The Adolescent Girl

Woman, by nature as well as by convention, is limited in the expression of her sex emotions. The adolescent girl developing into womanhood is imbued with all the desires that are the natural consequences of sexual awakening. Like the male adolescent she, too, feels the urge, but because of age-old traditions of the sanctity of virginity, the purity of maidenhood and the beauty of virtue, she may

not have any relations with the opposite sex unless they are sanctioned by the law or the church.

Having no outlet for her normal emotions, she sublimates them into ideals and thinks of romance, gallant Launcelots, Prince Charmings who are coming toward her from the realms of dreams to impress upon her lips the kiss of legitimate love.

The natural outlet for sex desire in young girls who are unable to actualize it in life is through erotic dreams, in which, whether shrouded in dream symbolism or expressed with realistic vividness, she is wooed or raped, as the case may be. Day dreaming, too, plays a large part in compensating the unmarried girl. She may sit idly for hours thinking of her future beloved, visualizing him, imagining situations in which they both play an important rôle, and otherwise living in imagination what reality will not permit her to have. Some times when the desire is very strong, there is an unexpressed wish to be raped, to be seized forcibly, so that sex experience may be forced upon her without her in any way being culpable. This same subconscious force works also in those young girls who, when out with a young man, ask for intoxicating beverages, so that if anything violating the feminine code of

virtue should happen, she would have the liquor to cast the guilt upon.

Sweet Innocence and Boarding School Filth

One of the worst things for the peace of a young girl's mind is her seclusion with girls of her own age in one of those pernicious institutions,—the boarding school. Between the ages of twelve and sixteen young girls are most curious to learn what lies behind the mysteries of sex, and being alone and without clean sources of information, they conjecture, seek to put two and two together and obtain knowledge that is far from the truth. Moreover, since they must have a means of giving vent to their eroticism they tell doubtful stories which they must have gathered from their elders, and sometimes even go to the degree of onanism and lesbianism among themselves. There is only one remedy,—complete, frank sex information at the oncoming of puberty.

Dangers Confronting the Adolescent Girl

Onanism, lesbianism and other secret vices have already been mentioned. There is, however, one

source of danger which has not been described. This is due to the suppression of legalized prostitution by the prudish laws which refuse to see the necessity of such institutions. We are not going to enter into the morality of the question, but as sociologists, economists and physicians we cannot deny that there is a definite necessity for a natural outlet of sexual emotions, and that under the present system of society the only solution is prostitution. Youths unable to marry because of their economic condition, or unable to obtain sexual gratification because of the infringement of the laws, are a source of menace to our young womanhood. Since nature must have her way, young men and women attending the same high-school or college enter into illicit relations, often to the detriment of the girl's health, who is forced into motherhood long before she is ripe enough for the experience.

Moreover, since there are no longer the "red light districts," known before to every adolescent, prostitutes establish themselves wherever they choose, so that frequently one's next door neighbor may be a *fille de joie*. Contact with such women may demoralize the young girls in their neighborhood, thus adding more followers to the ranks of folly. The

solution again is the imparting of sex knowledge and the enaction of sensible legislation.

The Climacterium or Change of Life in Women

The period in a woman's life when youth and beauty have vanished and when on the plant of her life only the withered bloom remains, has been called the dangerous age. At that period woman seems to want to clutch at the last beams of her vanishing charm. There are sudden bursts of passion, unexpected flashes of desire that die out just as suddenly as they are born. With some women sex emotion is persistent. A withered, sapless spinster who has never known love, or had any sex experience in her protracted virginity, may be seized by excessive desire for men verging on nymphomania. Many of the indiscretions that occur late in life, such as the marriage of a fifty-year old maiden to a youth of twenty, may be accounted for by taking into consideration the altered physical and mental state in woman, who is anxious to have at least an Indian Summer since she has irretrievably lost her Spring.

The process of the change of life is the direct opposite of what occurs at puberty. The endocrine

system is once again at work, but the gonads, instead of being the most vigorous as at the period of youth, fall into the background. The ovaries cease to mature their eggs and dry up. At this juncture each gland seeks to gain dominion over the others, and the result is a physical as well as a psychic change in woman. If the pituitary gains the upper hand, the result is a development of male traits. At times the resulting changes are so great that an almost different personality seems to have taken possession of the former body. The latter, too, changes unrecognizably. The breasts shrink, the womb dwindles in size, the voice sometimes changes and seems to approximate that of man. As Lombroso expressed himself, in his "Fisiologia della Donna," after the climacterium men and women seem to try to resemble each other as much as possible. In women facial hair appears, whereas it disappears in man. His voice becomes thinner, while hers grows fuller. Both suffer a loss of the hair of the head. Late in life, after the climacterium has established its changes, if man and woman were stripped and placed side by side, they might be mistaken one for the other except for the primary sex characteristics.

When Does the Menopause Occur?

The cessation of menstruation and the atrophy of the sex glands do not occur at the same time in all women. The life of the reproductive faculty is shorter in women inhabiting cold climates than in those living in warm countries. Married women who have led an active life have their menopause much later than others, while it is especially early in unmarried women.

Gallant drew up a table illustrating the age when the climacterium should take place.

Age at Which Menstruation Began	*Age at Which the Menopause Should Be Expected*
11	Between 50 and 52
12	48 50
13	44 46
14	42 44
15	40 42
16	38 40
17	36 38
18	34 36
19	32 34
20	30 32

In other words, the later menstruation is in appearing, the sooner it will cease. In some Afri-

can races the menopause occurs as early as between the ages twenty and thirty, although menstruation began very early. Other factors also play a part in accelerating or retarding the oncoming of the menopause. In poor, overworked, undernourished women menstruation ceases earlier than in others. Such is the case also with stout women suffering from pituitary deficiency.

Insanity at the Dangerous Age

Change of any sort always brings disturbances in its wake. Just as radical changes in government bring about revolts and insurrections, so also transition periods in the human being cause revolutions in the psyche. Insanity not infrequently seizes some women at this period, and like all forms of mental aberration, insanity of the menopause is more frequent in unmarried than in married women. In one-half of the cases of climacteric insanity, there were previous mental disturbances.

In his book on the menopause Currier says that the menopause is particularly annoying to "shopwomen, prostitutes, women of fashion, women who bring up large families of children on slender incomes, women who are hysterical and with whom

the affairs of life are constantly going wrong, and wives of farmers and mechanics who are frequently troubled to make ends meet." This is practically the class of women who develop goiter. However, they are also disturbed mentally during the change of life. It is not so much the menopause as the fear of one more pregnancy when menstruation ceases that upsets the mind of the poor married women to whom one more child means an insufferable burden. Widows, unmarried women to whom pregnancy would mean exposure, and prostitutes to whom it would signify inability to earn a livelihood, are also mentally disturbed at this period.

Some women have confessed that during the change of life they felt slightly homosexual. Their sex desires increased, and since cessation of menstruation deprived them of the chief certainty of pregnancy, they feared having relations with men because of the dangers entailed. In such cases psychoanalysis had to be applied.

Complexes and Insanity

Novak of Johns Hopkins cites several cases of insanity occurring at the time of the change of life.

A woman of forty-eight was convinced that she

was pregnant because she had had one coitus many years before. Nothing could shake her conviction, even after her uterus had been removed owing to a tumor.

A woman of forty-four who had recently passed through a severe attack of typhoid fever and who had previously exhibited signs of beginning menopausal disorder, believed that enemies were trying to steal her two children, whom she therefore kept under constant watch. She could even hear her supposed persecutors plotting under her window at night.

A woman of forty-nine, a widow who had hitherto been temperate in her religious beliefs and practises, became quite maniacal. Hour after hour, day and night, was spent in loud prayers before images of the saints.

The three cases quoted above are translatable in terms of psychoanalysis. The first woman had a subconscious desire to be a mother, which fear expressed itself in fear of pregnancy. The second woman, knowing that the menopause meant sterility, feared to lose the children she already had, because she could not bear others. The third case shows a sublimation of sex desires. Unable to express them

in the usual normal way, she lavished her fervor upon saints and ikons.

Smith, Macalister and Grimsdale cite another case which might be interpreted psychoanalytically. A woman of forty-nine with the delusion that she emitted a foul odor, was decaying and rotting with syphilis, asked her husband to shoot her. She finally committed suicide by hanging. There was evidently a complex there. She desired to be infected to prove that she was capable of having relations with men.

Dangerous Age in the Middle-Life of Man

When man approaches his fiftieth year there occurs in him a change equivalent to the climacterium in women. His gonads degenerate, and the prostate, an organ surrounding the neck of the bladder, loses its prominent position and recedes into the background. The prostate has both an internal and an external secretion, and has been compared to the female uterus because of the cyclic changes it has revealed under the microscope. During the climacterium, it retires from sex functioning, just as the uterus does in woman, undergoing shrinkage and

withering. It intimates that the man is on the decline.

The endocrine glands are also active in the middle-life of man. While the dominating glands of the particular personality gain the ascendency at this period, the sex glands recede and are scarcely active except by fits and starts. Like woman, man strives to keep his hold on sex life, and sometimes becomes a satyromaniac, or the vernacular "skirt-chaser." His mental condition also deviates from the normal, and while he may previously have been a sober, quiet paterfamilias he may turn into a philandering Don Juan.

Psychoanalysis and the Climacterium in Man

It often happens that man, when he discovers impotence coming over him, seeks to retain his vigorous manhood by having young girls stimulate him. A noteworthy case is that of old King David in the Bible, who had his wise men bring him a fresh young maiden, Abishag, to make him feel less old. The same feeling of old age is present in those men who are not aroused sexually by their wives but who are often seized by a violent desire that other women could gratify. Analysis in most cases has shown

that a complex of impotence caused by old age existed, which was aggravated by the wives who looked upon their husbands as old, spent, and physically unable to have coitus. With other women, who had not known them as long and as intimately, they felt young and powerful and could indulge in physical pleasures as well as earlier in their lives.

Nations as well as individuals have their dangerous ages. They have their puberty, their adolescence and their senility, all of which are best revealed in their social, cultural and artistic life. It is a danger sign of approaching senility and jadedness if too much stress is laid upon the physically young and immature. The childish pictorial art of the United States, for instance, that has neglected pure womanly beauty for the thymus type of young girl on magazine covers points with an accusing finger at physical surfeit and degeneration.

CHAPTER XV

THE GLANDS, LONGEVITY AND DEATH

THERE are very few men who, if they were offered a lease of life equal to that of the venerable Methuselah, would not accept it with joy. Immortality, that is, immortality of physical being, might prove a burden, for even the deathless gods of Olympus sometimes envied man his supreme gift of death; and yet there are many who would prefer an interminable life of daily tribulations to a short span of intense enjoyment followed by the negative state of death for all eternity. The philosophers of the ancient world sought immortality of being, and when they could not attain it they found a deathlessness of another sort,—in ideas, to wit, Plato's higher realm of the Universals. Yet though such abstract immortality satisfied the men of keener intellect, those whose feet were solidly planted upon the world of matter sought something more tangible —if not endless, at least long life.

In the course of scientific research we have had men seeking fountains of eternal youth, secret springs that would have him preserve his strength and manhood. Sex and vigor of procreating, in spite of what preachers and sublimated esthetes have said about them, have always been the primary considerations in man. His earths, as well as his heavens, have been peopled with virile and fertile womanhood. Did not Mohammed promise his devotees that after death the worthy would go to a heaven where each man would find his mates in beautiful women whose virginity renewed itself with every coming night? The thoughts that obtained in Mohammed's day still prevail to-day, and any scientific discovery that hints at a greater lease of *sex* life is acclaimed with joy by the multitude. To-day endocrinology is promising longevity, and what is more, rejuvenation of procreative powers.

Man's Normal Span of Life

The average length of a human being's life is from ninety to one hundred years. As Buffon reckoned, man attains an age-limit equal to six or seven times the time required for mature development, which he

placed at fourteen years. This would give an average of about ninety years. Yet, as Voronoff asks, is a human being fully developed at fourteen, or does he attain full growth at a later period, say, the age of twenty? According to him Buffon's method of reckoning is correct, but he finds that the result would be more approximating the truth if one took eighteen or twenty years as the normal period of maturity. The age-limit of man in this case would not be ninety, but from 120 to 130 years. Such ages are not impossibilities. In some rare instances men have attained the century and a half mark, and then died of natural causes. In one instance it is recorded that Kentigern, the founder of the Abbey of Glasgow, reached the age of 165 years. Voronoff quotes other interesting cases of longevity. Drakenberg died at the age of 146 years, while Thomas Parr, buried at Westminster Abbey, attained the age of 152 years and 9 months. It is known that a significant percentage of the population of France and Italy reaches a ripe old age, in the former country the yearly number of deaths occurring over the hundred year limit being 150 or more. Longevity is not solely peculiar to men, for there are also historic cases of women who lived to a hoary age.

Longevity in Man and Animals

Study of natural phenomena indicates that the greater the perfection of the organism, the shorter the life-limit. In comparing the longevity of animals with that of man, we are forced to admit that many of the inferior species are far more fortunate than man in this respect. Turtles and crocodiles are noted for their remarkable ability to withstand death, and some of them have been cited to have lived for centuries. Fishes also are long-lived, some carps attaining the age of 150 years. Next in line in longevity are birds. Parrots, eagles and crows often pass the century line. The many legends based on the periodic appearance of birds of evil omen may be accounted for by the fact of their long lives. Everyone is acquainted with the superstitions relative to the gray raven of Versailles that appears in the royal gardens shortly before the death of the ruler. Every palace on the Rhine has its ancient eagle. We are inclined to scoff when the papers print amusing notices of peasants who have been terrified by the cawings of ill-omened ancestral crows. We look askance at their minute descriptions of the huge birds which their grandparents had seen

before them. And yet, why not? If an eagle may reach the age of 118 years and a hawk 160, while man only in rare instances passes beyond 90, what is extraordinary in the event?

When we reach the mammal scale in evolution, we find that the life span becomes more limited. With the exception of man only the elephant may be said to live beyond ten decades, the other animals, especially those that have been domesticated, seldom reaching the half-century mark.

What Causes Longevity?

Just what quality or property in an organism causes a greater length of life than in another organism of the same species? Is it inherited tissue, moderate living, regular habits? Though heredity does play a great part, there are too many exceptions to the rule for it to be given grave consideration. Moderate living and regular habits also are not positive factors, in spite of the claims of certain centenarians that they have never smoked, or drunk a cup of coffee in their lives. From their reports one might think they had lived a life as rigorous as that of an ascetic of the Middle Ages. On the other hand there have been cases of longevity in which the indi-

vidual had always been far from moderate, even going to extremes in carnal and material enjoyments. Voronoff quotes the case of the surgeon Politiman who lived to the age of 140 in spite of the fact that since his 25th year he had drunk heavily and had never gone to bed until quite intoxicated. There is also the case of the witty Irishman Brawn, also a follower of Omar, and who, at his death, had the following epitaph written above his grave, "He was always drunk, and when he was in this state he was so terrible that even Death feared him." In the case of two women who lived beyond eleven decades, one had smoked since her early teens, while the other had been accustomed to drinking over forty cups of coffee each day. It is evident that longevity is not dependent upon moderate habits.

Life and Death

It is not for us here to go into detail on the origin of life and its evolution to the present state. Biology has long shown that the cell, that bit of protoplasm containing a nucleus, or vital center, was the first living organism. Darwin then, in his "Origin of Species" and the "Descent of Man," traced its development until it reached the highest possible ex-

pression in man. In the human organism, indeed, in all living matter, the cell still plays an essential rôle. As we trace its development from its most elementary form in the amœba, a mere mass of protoplasm with a nucleus, to its evolution into fiber and muscle cells, we understand that after all man is nothing more than a complicated mass of cells, himself originating from a microscopic ovule, or egg.

The phenomenon of life is well-known to us. Death, too, as a physical fact, outside of the mystery it presents in its spiritual phase, is not a source of speculation. Everyone is acquainted with the results of death—the erstwhile thinking active organism ceases to function, and decay sets in. The simplest explanation of the result of death is the naïve remark of the Robot in R. U. R. upon being asked what would happen to him if he died: "I would cease to move."

In one respect human beings are alike,—in their desire to postpone death as long as possible.

The Glands and Longevity

In studying the human organism we find that with the coming of old age there is a deterioration of all the organs of the body, as though the human ma-

chine were wearing out through long usage. As we have shown before, the endocrines undergo various changes, some of them accelerating their functioning and others atrophying. Among the endocrine glands that suffer diminished functioning when old age gains the ascendency are the very glands that are essential to procreation,—the gonads. There is no sexually potent man who ever feels old, even though he may have attained the age of gray hair and wrinkles. If he is still able to take part in the continuation of life, he is still young.

It is, therefore, with increasing apprehension that a man or woman looks upon the diminution of sex potency, for that, in itself, proclaims advancing years, with the ultimate coming of death. Although all the endocrines at an advanced period of life undergo changes, the effect of the sex glands, because of their importance, is felt most of all.

Endocrinologists have shown conclusively through their experiments upon human beings and animals that old age, that is, as far as sex potency and vigor go, may be retarded far beyond the normal period through consistent gland therapy. Rejuvenation is no longer the dream of a doting Ponce de Leon, but an established fact.

Rejuvenation of the Aged

When old age sets in and there is a lack of sexual force resulting in impotence, it is not because the individual does not possess perfectly healthy spermatozoa, but because the atrophying of his glands of internal secretion prevent him from experiencing any sex appetite. Grafting vigorous young glands, or injecting glandular fluid, will in such cases be of inestimable value, causing rejuvenation and the reawakening of sex desire. A convincing example is that performed by Voronoff on the ram, quoted in a previous chapter.

Though both the method of grafting and that of injection of glandular secretions produce beneficial results, the former method of rejuvenation is far more valuable, for when a healthy gland is incorporated in the organism, it is continually pouring its secretion into the blood and works in harmony with the other organs of the body.

Difficulties Encountered in Gland Therapy

We have spoken before of the successful gland transplantations performed on cretins and myxedematous beings. In most cases monkey glands

were used for various reasons,—first, because it is difficult to obtain human glands except from near relatives, and secondly, because monkey glands are purer and freer of alcoholic degenerations, as is the case with human beings.

Many ways have been suggested of obtaining glands for therapeutic purposes, the most recent of which was the proposal to extirpate the endocrines from prisoners condemned to death. However, for ethical reasons, it is a foregone conclusion that the bill will not pass the legislative bodies of France, where the proposal was made. Another way of obtaining glands was suggested by Voronoff. He claims that the glands, like some other organs of the body, are still active for some hours after death, and that therefore all robust individuals who die through accidental causes should have their endocrines extirpated for the benefit of the ailing. Again, as in the former case, prejudices and ethical considerations will be instrumental in obstructing its execution.

Glandular Extracts and What They Do

We must not mistake the effects of some gland extracts with the specific action of the gland itself. The purpose of extracts is to supply any deficiency

on the part of the gland caused by atrophy or functional inactivity. To illustrate, we have shown before that wherever there is a lack of thyroid secretion, resulting in myxedema and cretinism, the administration of glandular extract has remedied the deficiency, in most cases bringing the individual back to normal.

The extracts made from an endocrine body exert upon the corresponding endocrine gland a more or less permanent influence, in most cases regulating the function of the organ, remedying the ailment, and restoring it to normal functioning.

Sometimes glandular extracts are used as specifics in certain conditions of the human body. It has been found that the extract of the posterior lobe of the pituitary gland, pituitrin, exerts an influence upon the muscles of the uterus. In many cases of difficult labor, where the womb does not contract normally to expel the fœtus, injections of pituitrin stimulate its activity and obviate the necessity of instruments.

Glandular extracts are an extravagant way of effecting cures, for often, as in the case of thyroid disturbances, the grafting of a single gland does the work with far better results than continued injections of extracts. Randall, who isolated the most

active principle of the thyroid, thyroxin, found that he had to use over 6500 pounds of thyroid glands to produce one ounce of extract. Nevertheless, the administration of thyroid, adrenal, ovarian and pituitary extracts usually obtained from desiccated animal glands, is of great therapeutic value and is used daily by physicians in their practise.

Some authorities claim that there never was a uniglandular endocrine disorder, but that abnormal functioning of one gland usually brought about the same condition on one or more glands. From our previous study, we have found that the whole endocrine system is closely allied, and that each gland has its sympathetic correspondent. Such being the case, it has often been found advisable to reenforce the effect of one glandular extract by supplementing it with others. It is not infrequently the addition of other glandular extracts that brings about success.

Gland Extracts in Goiter and Senility

Because of the relation existing between the thyroid gland and the gonads, it has been found that in critical periods of a woman's life, puberty and the menopause, there occurs in many cases a thyroidal enlargement. It indicates that it is due to the at-

tempts of the thyroid body to meet the demands made upon it by the changes which the organism is undergoing. In such cases thyroid extract with the addition of ferrous iodide and other ingredients proves of great value.

When the gonadal function is on the wane in men, at the oncoming of senility, glandular extracts composed of spermin and thyroid stimulate the sex cells and bring about a marked amelioration in the condition.

Psychoanalysis and Endocrinology

The aim of medicine has always been to prevent human ailments, and to rid humanity of them, once they have set in. Since upon the well-being of the organs of the body depends the health of the organism as well as the proper equilibration of the mind, it is the ideal of modern therapy to bring about and maintain a state of bodily and mental health. It is for all men of science to work hand in hand for the common purpose of attaining the goal. We have seen before how psychoanalysis and endocrinology have together effected cures which either one individually would have found difficult of accomplishment. We have observed how both to-

gether have brought about the regeneration of subnormal and abnormal individuals, making of them useful members of society instead of burdens. We have shown how health has been brought back in cases where no phobias or complexes were present through the administration of glandular extracts or the grafting of healthy glands to replace the diseased ones. We have demonstrated the earnest efforts of investigators the world over to wrest more and yet more secrets from nature for the purpose of alleviating disease and ameliorating the conditions of the human race. All this labor has borne, and is still bearing, fruit.

Psychoanalysis as a science has been established beyond dispute. It is a recognized and a valuable factor in the diagnosis and treatment of mental disease. In selected cases, it proves beneficial, but the indiscriminate use of this method as a panacea for all ills, irrespective of underlying physical causes, tends to put it into disrepute. In such cases, in order to prevent the failure sometimes met with where psychoanalysis alone is used, it is necessary to examine the body as well as the mind.

When psychoanalysis, endocrinology, and other allied sciences realize that in working in unison lies

ultimate achievement, the problem of scientific success, and therefore the resulting welfare of the human being, will be headed toward a more certain solution.

FINIS

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